UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

In re: Flint Water Cases	Civil Action No. 5:16-cv-10444-JEL-MKM (consolidated)
Elnora Carthan, et al. v. Governor Rick Snyder, et al.	Civil Action No. 5:16-cv-10444-JEL-MKM

Hon. Judith E. Levy
Mag. Mona K. Majzoub

HIGHLY CONFIDENTIAL

REMOTE VIDEOTAPED DEPOSITION OF
WILLIAM BITHONEY, M.D.

November 5, 2020

VOLUME I

Remote videotaped deposition of WILLIAM BITHONEY, M.D., conducted at the location of the witness in Fayetteville, Georgia, commencing at 9:05 a.m., on the above date, before CORINNE T. MARUT, C.S.R. No. 84-1968, Registered Professional Reporter, Certified Realtime Reporter and Notary Public.

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THE VIDEOGRAPHER: We are now on the record. My name is Robert Martignetti. I'm a videographer for Golkow Litigation Services.

Today's date is November 5, 2020, and the time is 9:05 a.m.

This remote video deposition is being held In Re Flint Water Cases.

The deponent is William Bithoney, M.D.

All parties to this deposition are appearing remotely and have agreed to the witness being sworn in remotely.

Due to the nature of remote reporting, please pause briefly before speaking to ensure all parties are heard completely.

Counsel will be noted on the stenographic record.

The Court Reporter is Corey Marut and will now swear in the witness.

(WHEREUPON, the witness was duly sworn.)

(Clarification by the reporter regarding audio.)

MR. STERN: Dave, if I can just put on the record that per the Court's order from a few weeks

ago that the parties to this lawsuit are those and only those who should be attending this deposition and that while there may be some standing orders to order transcripts, either rough drafts, dirty copies or full copies post deposition, that only the individuals and the parties that they represent and who are participating in this deposition should receive any transcripts, based on confidentiality, personal protected health information, age of the Plaintiffs and Judge Levy's prior rulings.

MR. ROGERS: Yeah, Corey -- not Corey Stern. Corey Marut. Had you made been aware of that? That you got to be careful when you prepare the rough transcript and know who to send it out to. It should be limited. Okay.

So, it would be the people you see who are participating in this deposition and I don't think anyone else, but you square that away with Corey Stern. He will make sure you get the right info.

WILLIAM BITHONEY, M.D.,

called as a witness herein, having been first duly sworn, was examined and testified as follows:

EXAMINATION

BY MR. ROGERS:

Q. Okay. Dr. Bithoney, good morning. I introduced myself to you before we went on the record. My name is David Rogers. I rep the VNA Defendants. I will be asking you most of the questions, if not all of them today. So, good morning, sir.

A. Good morning.

Q. Where are you located where you're attending the deposition from today?

A. I'm just -- I'm just outside in Atlanta in Fayetteville, Georgia.

Q. Okay. When we were conversing about the vote counting, did you get your votes in? Did you get your vote in in person or by mail or what?

A. I voted early in person. I originally was going to vote by mail, but I got so concerned that my vote wouldn't count that I went to the election office and got an absentee ballot and then I was still -- I still concerned, so I traded my

absentee ballot in for in-person voting.

Q. Interesting. Okay. Well, big turnout. That's for sure. Everywhere across the country.

Can you tell me, Doctor, when were you first retained as an expert in this case?

A. Well, I don't have a retention agreement if that's what you're asking. I've worked with people at the Levy Konigsberg firm for many years. I believe I've worked with Corey for ten years. So, I don't feel the need to have a retention agreement, if that's what you're asking.

Q. I'm asking when. When were you retained to work on this case?

A. Sure. I visited Flint sometime in 2015 for the first time, and I came -- I went back to Flint. I'm not sure what year. I'm sorry to be confused. It might have been 2017 or 2018 I went back again.

Q. Okay. But you said you visited Flint. I'd like to know when were you retained by Mr. Stern or someone from his firm to work on the case?

A. Well, in 20- -- in 2015 I actually went there and I submitted a bill for services rendered

at that time. So, if that is the equivalent of retention, that's when it was.

Q. Okay. I had asked for copies of invoices or time records that you have spent on the case. Do you maintain such records?

A. I don't maintain records from years ago. I have given you an invoice for the bellwethers that we're invest -- looking at now. But I don't have billings from several years back.

MR. ROGERS: What's the status, Corey, of the prior invoices?

MR. STERN: My accounting department is supposed to have gotten that to me yesterday. But at some point today I will have them for you.

MR. ROGERS: Okay. Let's try to revisit that at the lunch break then and we'll do that.

Does that include, Corey Stern, the most recent ones, the bellwether ones?

MR. STERN: I believe so.

MR. ROGERS: All right.

BY MR. ROGERS:

Q. So, Doctor, what was your understanding of what your assignment was when you were first retained as an expert consultant in the case back

in 2015?

A. Well, I went and had a town hall meeting with the people in Flint at one of the local schools, and we spent time educating the public about the dangers of lead poisoning and the seriousness of children being affected by lead and the consequences of that. And that was basically it in 2015.

Q. What month was that?

A. I'm sorry. I don't have that.

Q. Do your invoices record the dates on which you did work in the case for which you billed?

A. Well, for 2015 I don't have an invoice, and for 2018 I did some similar work and don't have an invoice. But there was -- there are breakdowns and whatever invoices are more current, they would indicate what I did.

Q. I recognize that you have said that you don't have your invoices for prior years, but when you created the invoices in 2015 for the work that you did, would that invoice include the work at this town hall meeting that you attended?

A. Yes. That was essentially what we did.

Corey was there. I was there. And it was a town hall meeting. And I believe that's all we did at that point. It was more of an educational session.

Q. Did any of the representatives of the bellwether Plaintiffs, the four that we are -- have at issue here, that would be S[redacted], T[redacted], V[redacted] and W[redacted], attend that town hall meeting?

A. Not to my knowledge. I certainly did not meet them there. There was a relatively large group, at least 50 or 70 parents mostly, and I didn't really have occasion to know if any of those four were there. They may have been there, but they did not introduce themselves to me to the best of my knowledge.

Q. Do you have any records, memoranda, PowerPoint presentation, notes or anything like that that I have just described which contain or describe the content of the presentation or whatever the substance of what you did at that town hall meeting?

A. We did not present slides. It was just a verbal lecture, discussion and question-and-answer session, and then we actually

broke down into different groups. I led a group discussing the impact of lead poisoning on children after there was a general discussion of the impact of lead poisoning on children where Corey and I were both present.

And there was another meeting, same day -- you know, one meeting was less than an hour and the next meeting was about an hour -- where I met with parents and discussed lead poisoning and the side effects.

Parents were very concerned about issues such as rashes and other things that probably weren't related to lead poisoning. So, it was a general informational meeting.

Q. Let me try to see if I could jog your memory about when in 2015 this meeting took place.

Do you remember like what the weather was like? Was it summer? Was it spring? Was it winter? What?

A. Well, you know, I don't remember it being bright and sunny. I did have -- I did have a coat on, I remember that, because I put it up above my seat in the airplane. So, it may have been in a colder season.

But I don't want to answer definitively because it's been so long ago and I've traveled so often and so many places since then.

Q. Whereabouts, what was the physical location where this meeting took place?

A. It was a school. And what I remember most about the school was that all the water fountains were shut off and taped up. But I don't recall the name of the school. It was a school auditorium.

Q. And you mentioned that you didn't have any slides. I assume you're referring to PowerPoint slides. Did you have --

A. Yes.

Q. Did you have any memoranda or like notes or some type of written summary of the comments that you were intending to make and did make at that meeting?

A. I don't recall making any such notes. You know, I've worked with children with lead poisoning for 40 years, so I'm typically relatively comfortable even standing up in a large audience of physicians and talking about lead even without PowerPoints and memoranda, et cetera.

And this was essentially a pure informational meeting with laypeople. So, there was nothing intensely scientific that we were going to discuss. So, I was just talking about the general impact of lead on children.

Q. At that time did you tell the attendees that they should not be drinking the water from the Flint River water supply?

A. I don't recall. I'm not sure. Probably. But, you know, I --

MR. STERN: Hey, Doc.

THE WITNESS: Go ahead.

MR. STERN: Doc, don't guess. Don't guess. Just if you know.

THE WITNESS: All right.

MR. STERN: If not, just say I don't remember.

BY THE WITNESS:

A. Okay. I'd like -- I'd like to be responsive, but my memory is problematic for that two-hour meeting going on five and a half years ago or five years ago.

BY MR. ROGERS:

Q. What airline do you usually fly if you were traveling to Michigan from wherever it is you

came from?

A. Well, I typically fly Delta out of Atlanta, but I don't know if I flew Delta then.

Q. So, the work that you did at this meeting, you issued an invoice, even though you don't have it now, you issued an invoice to Mr. Stern's law firm for the work that you did during that meeting, is that right?

A. Yes, I would have done that for sure.

Q. And you got paid for it?

A. Yes.

Q. And -- okay. That was the first meeting. I think you mentioned that there were two that day. Where was the other one? You mentioned an elementary school or a school auditorium. Where was the other one?

A. Well, in a classroom. It was the same day, a two-hour total meeting time, one meeting in an auditorium and one meeting in a classroom with a breakdown of some of the parents. Not all of them.

Q. Why were there two separate meetings, do you know?

A. I don't know who else met with -- I think Corey may have met with people, but that goes

into the realm of guessing. I know that there was a separate meeting with me because parents were interested in the medical impact of lead poisoning, and that's what we discussed in the second meeting, the same day, total of two hours including the town hall and the classroom meeting.

Q. When you say "the town hall," you met at a -- in a class -- a school's auditorium. Is that what you're referring to as the --

A. Yes.

Q. -- quote, "town hall meeting"?

A. Yes. It seemed to be an auditorium. I don't think it was a gym. I don't recall a basketball court or anything like that. It was a very large room in a school, which I believe is an auditorium.

Q. All right. And do you know if in the classroom meeting that was held that you attended whether any of the parents of the current four bellwethers -- and I'm not going to repeat their names every time. You know who I'm referring to, right?

A. I do. And I have their names besides me. I have my reports on the four.

Q. Great. So, were any of those parents in attendance at that meeting in classroom that took place in 2015?

A. I don't know. I can't say that I met anybody personally. I spoke with a couple of people after the meeting, but I didn't get names or addresses.

It wasn't -- for me, it wasn't a recruiting kind of thing or an attempt to meet individual clients for any specific purpose at that point, but just to educate the parents.

Q. Same question that I asked you earlier just to make sure.

In the classroom meeting, did you tell any of the parents that they should not be drinking and having their children drink the water from the Flint River water supply?

A. I'm not sure if the Flint water was still potentially contaminated at that point or not. So, I don't know.

Q. Well, that's a good question. Maybe that would help to define the time frame.

Do you have an understanding, Doctor, that the Flint River water supply was switched back

to Detroit water sometime in early November 2015?

A. That's my understanding. I thought it was October, but maybe that's when the resolution was passed.

Q. I think -- I could be mistaken, but the facts are the facts. I mean, it was -- the decision was made in October, and then I think it was actually done in November.

But in any event --

A. Right. Well, that's what I was referring to, the October. So, I wasn't sure when it was implemented. I wasn't in Flint, but I was following the City Council's recommendation -- recommendations for switching in October.

Q. So, the meetings that you've described having taken place at this school, did those meetings take place after the time at which the decision was made to switch back to Detroit water in October or before?

MR. STERN: Objection; asked and answered.

BY THE WITNESS:

A. Yeah, I'm not sure. I just -- I just can't say. And Corey's advice is very helpful to me. I don't want to guess. I want to be helpful,

so I find myself reaching to try to answer your questions. But I don't recall exactly what month I was there.

BY MR. ROGERS:

Q. Okay. You mentioned that you had traveled to Flint at some other occasion as part of the work that you did after you were retained in this case. Tell me about that, please.

A. Sometime -- I think it was 2018 but, again, it may have been, you know, 12 months on either side. It could have been '17. It could have been early '18.

I met with several children and parents, and I did physical exams on them and discussed lead poisoning with the parents. So, and that was at least -- at least a couple of years ago.

Q. Okay.

A. Getting a sense of what was happening with them.

Q. Okay. Was -- were any of those children that you did physical exams on any of the four bellwethers remaining or in the case that we're concerned about right now?

A. I'm not sure, but I doubt it. I'm not

sure. I don't think any of them were in that group.

Q. The reason I ask is that you mention in your reports that you, because of COVID and travel restrictions, as of the time that you wrote your reports for these four bellwethers you hadn't conducted physical examinations of them.

So, my question is hoping to maybe refresh your memory as to whether you had ever conducted any physical examinations of those children.

A. I don't recall the names of the children I saw back then. But I don't -- none of the names of the bellwethers struck a chord with me and with my recollection.

Q. For those that you did do physical examinations of in the time that you were there in either 2017 or '18, did you do -- take notes and have records of those examinations that you did?

A. I took some notes, yes. I don't have them in my possession anymore.

Q. Why not?

A. I don't retain records for years, and I'm sorry that that's the case, but...

Q. Since the date of your report, which was July -- I think all four of these bellwethers, yeah, July 25, 2020, have you conducted a physical examination of any of those four?

A. No.

Q. Did you attend Flint as part of your work as a consultant on this case at any other times?

A. No.

Q. With respect to the four bellwethers that are at issue here, and I'll just call them the four bellwethers for simplicity, and we'll know what we're talking about, what did -- and it might apply to others as well.

But for these four bellwethers, what did you understand the nature of your assignment to be as an expert consultant in the case?

A. Well, I was asked to evaluate their history, physical -- I typically do a standard physical examination and as well as a detailed history along with that; and typically I do developmental testing and a standard physical exam, but because of COVID I wasn't able to see the children in person.

But I got social history, where did they live, where did they live and when did they live, family history, genetic history, history of developmental difficulties in the family members, past medical history, history of hospitalizations, what's called a review of systems, headaches, nausea, vomiting, blurred vision, double vision, cough up blood, trouble hearing, trouble seeing, asthma, difficult breathing, gastrointestinal disease, rashes, broken bones, evidence of child abuse. Just a very extensive history.

And in this case, unlike in other cases, I also looked at how much water the children ingested and how they ingested it. So, I learned, for instance, for all these four bellwethers, they mixed their water, not only -- the kids drank water not only as plain water but as Kool-Aid or mixed with Jello or in soups or in cooking, tea, whatever. And for infants they mixed Enfamil with iron with tap water.

I learned about whether any of them were boiling water, for example, which concentrated the lead in the water and increased danger.

And at the end I gave them counseling as

to what I thought their child -- child's prospects were in terms of their medical health.

Q. Thank you. I think what you were doing was describing what you did.

A. Yes.

Q. And thanks for that. I was going to ask you that, and I may get into that in more detail or I will.

But my question was what did you understand your assignment to be, that is, what is it that you -- what role did you play and what was the nature of your assignment as an expert consultant in the case?

A. Well, I was asked to evaluate the children and evaluate their history of potential lead intoxication.

Q. Anything else?

A. And -- no, I think that was it.

Q. Okay. You described at length a series of questions or a series of pieces of information that you were gathering up when you -- as part of your work with these four.

Do you have sort of a standard questionnaire or checklist of information that you

ask or ask about?

A. I don't maintain a standard checklist. It's so ingrained after 40 years of practice. As you saw me listing what a review of systems was, I greatly abbreviated it, but I have it pretty much memorized.

So, I don't like to have paper or computers get in the way of talking to parents as best I can. So, I don't keep a lot of paper. So, I would only note the positives.

Q. So, when you conducted the interviews of the parents for purposes of evaluating them for these four bellwethers, that was by telephone, is that right?

A. By videoconference. No. I'm sorry. By telephone. Please excuse me.

Q. That's all right.

A. Telephone.

Q. Okay. And while the interviews were taking place, did you take notes and write down what the parents were telling you when you were conducting these telephonic interviews?

A. Yes, I did.

Q. And then what did you do with the notes

afterwards?

A. Well, I made the reports, the reports include all the salient information, and then I got rid of the notes.

The notes would probably not be legible even if they were available to you. My handwriting is problematic. But I don't have them.

Q. Okay. So, what you did was any, in your mind, any information that was important, you summarized and put into the reports themselves, right?

A. Yes. So, for instance, if there was a history of head trauma, I'd want to note that.

That's just one example. I mean, there are dozens of things that are asked in a standard medical interview as detailed as what I was doing.

Q. Okay. Did you in carrying out your assignment to, paraphrasing here, but to conduct an evaluation of these four bellwether Plaintiffs for lead intoxication or lead poisoning, did you follow the same practice with respect to each one of them, that is, you did the same things to do that evaluation for each of these four bellwethers?

A. Yes, and I should say my evaluation was

much more detailed than what we're discussing, because we got files, depositions, I'm going to venture to say thousands of pages of documents which refer to each of these children and you're in possession of all those things.

There was a -- I don't want to use -- a data dump. I don't know how else to categorize it. I was given data on all the cases, and that was thousands of pages. And I reviewed those pages in detail and extracted salient features based on the criteria we have been discussing, put those in my notes and then composed the notes. I'm sorry. Composed my report.

Q. Okay. That's what I was going to ask you about next. You're anticipating my questions.

Each of the reports has right at the beginning a list of the records that you had reviewed, and when we got to your report, I'll go through those.

But in terms of the work that you did for your evaluation, so far we've had -- you've described the interviews that you conducted of the parents and the records review, right, those two things?

A. Yes.

Q. Did you do anything else in your work to carry out your assignment?

A. No. I called Dr. Krishnan I know asking for her reports. I think that's it. I didn't speak with Dr. Specht before writing the reports. I didn't speak with any other physician before writing the reports.

Can you hear me, by the way? My voice is a little low. I'm having some GE reflux, so my vocal cords are a little inflamed. But can you hear me adequately?

Q. I can. Thanks. Yeah, I hear you fine. Importantly, Corey Marut -- I'm sorry.

MR. ROGERS: How do you pronounce your last name, Corey?

THE REPORTER: It's Corey Marut.

MR. ROGERS: Corey. She's the important one. So, she'll -- please let us know if you can't hear the doctor. I hear you fine, Doctor.

THE WITNESS: All right. Thanks.

THE REPORTER: I hear you fine, Doctor. Thank you.

THE WITNESS: Thank you.

MR. STERN: Just take a second. I should probably know this, but who is Robert -- is that the videographer? Robert Martignetti?

MR. ROGERS: Yes.

MR. STERN: Thank you. Sorry. I just see two screens. No problem. I'm sorry.

THE REPORTER: And there's also my backup you'll see.

MR. STERN: Yeah, yeah. I saw that. I apologize.

MR. ROGERS: That might be Ted Leopold's alias. I'm not sure, Corey. Maybe. Does he go by that?

MR. STERN: He goes by -- don't worry about it. I'm not going to go there. I got a lot of nicknames.

BY MR. ROGERS:

Q. With respect to the four bellwethers, Doctor, during what period of time, if you can remember, did you conduct the telephonic interviews of the parents?

A. Well, obviously before July 25, 2020, probably a few months before that. So, perhaps beginning in May of 2020.

Q. And all the documents that you received, was that part of a, you know, periodic or ongoing basis that you were provided with records for each of these bellwethers?

A. Well, some of the records may have been provided sequentially. Some -- a couple of them may have been provided on the same day. I'm not sure when I received them exactly, but it was around that time frame, the spring of 2020.

Q. Okay. When you generate your invoices, which -- or invoice at least that I hope we'll have a little bit later on, do you describe and have time entries for the work that you did on a particular day and how much time you spent doing it?

A. Typically I do. I'm not sure if I did that with this invoice because I've worked with Corey Stern for so many years. There is a trust level where I may have just written the hours. I don't recall. I don't have the invoice with me.

Q. Did you issue an invoice that was separate for each Plaintiff or was it one invoice for the work that you did for all of them, because you wrote, what, about 14 different reports?

A. Well, for the four bellwethers, I looked at the total amount of time that I spent and divided it by four. I assigned the hours equally to each one because they took similar amounts of time. Rather than try and break it down, I just had a running total.

Q. The work that you did in interviewing the parents of these bellwethers, reviewing the records and writing the reports, did that all take place during this year, 2020?

A. Yes.

Q. And, so, the invoices should reflect all of the work that you did in 2020 with respect to these four bellwethers, is that right?

A. Yes.

Q. Okay. Let's take care of some housekeeping matters. I'm going to share my screen and we'll mark a couple of exhibits, eight in total, just to get some things out of the way here to make sure we have it. So, let me share my screen.

I showed you this right before we got started, Doctor. But this will be, Corey, Exhibit 1, which is the Notice of Taking

Deposition.

(WHEREUPON, Bithoney Deposition Exhibit No. 1 was marked for identification: Notice of Taking Audio-Visual Deposition.)

BY MR. ROGERS:

Q. And, Doctor, can you see that all right?

A. I can.

Q. Excuse me. I have a strange pop-up coming up on my screen whenever I open up a pdf and it causes me to have to X out of it.

Did you see on your screen any strange pop-up for Adobe Acrobat pdf come up, Doctor?

A. No. I just see the Notice of Taking Audiovisual Deposition, and I see it clearly and fine.

Q. Good. Okay. I don't know what that other thing is, but I'll try to get rid of it.

Anyway, this is the Notice of Deposition that was issued for your deposition that is taking place today, and attached to is what we call a Schedule A or a document request; and I'm going to go through this in detail at the end of the deposition and make sure that you have produced

these materials.

But were you provided with this Notice of Deposition and the document request, Schedule A, attached to it?

A. Yes.

Q. And to the best of your ability, did you go into your files and records and produce the information that was requested here in this document request?

A. I believe so. I mean, this is a long list. So, if we need to go over it one by one for me to be 100 percent sure.

Q. We're going to do that at the end, but thank you.

So, we will mark as Exhibit 2, please, your CV.

(WHEREUPON, Bithoney Deposition Exhibit No. 2 was marked for identification: Curriculum Vitae, William G. Bithoney, MD, FAAP.)

BY MR. ROGERS:

Q. Again, I'm not going to go through the whole thing, but if you wouldn't mind just taking a look at this and confirm that this is your current

CV. I think it had a date of September 2020 on it.

A. I'm sure it is. It looks -- it looks to be my CV.

Q. Do you see here how on this page I have at the bottom here --

A. Yes.

Q. -- "Long Version September 2020"?

A. Yes.

Q. Okay. So that will be Exhibit 2.

Let's go to now we'll mark as Exhibit 3 your testimony list.

(WHEREUPON, Bithoney Deposition Exhibit No. 3 was marked for identification: Testimony List.)

BY MR. ROGERS:

Q. Having worked with Mr. Stern for a while, I think you might be aware of this. But have you worked with Mr. Stern in cases that are pending in the Federal U.S. District Courts as opposed to State Courts before?

A. No.

Q. In the Federal Court, the requirements are that experts are supposed to provide a list of their deposition testimony and/or trial testimony

for the previous four years.

Does this Exhibit 3 contain all of the cases that you have testified in by way of deposition or trial in the last four years?

A. It does.

Q. What was that case about, the McIntosh vs. Butler case?

A. It was a child who had elevated lead levels, lead poisoning issues.

Q. Was that trial or deposition testimony that you gave?

A. There was no deposition. There was a trial.

Q. What was the source of the lead exposure to that child?

A. I'm not sure. I don't want to guess. There are so many -- so many years gone by since then. But if I recall, it was a fairly typical lead poisoning case.

Q. What do you mean by "fairly typical"?

A. A child who was lead poisoned who had developmental delays.

Q. Okay. Is there anything in a fairly typical lead case about the source of lead

exposure?

A. We do examine that, yes.

Q. What are the fairly typical sources of lead exposure?

A. Lead paint, leaded dust, leaded soil, a number of folk remedies like Alarcon or Ayurvedic type therapies, lead in the water. A whole list of things. Different medicinals that are used in various countries that are tainted with lead.

Q. Thank you.

MR. ROGERS: Let's mark as -- well, I'm going to hold as a placeholder Exhibit 4, Corey Marut, for the invoices. So, hopefully we'll get those.

So, the next document that I will mark at this time as Exhibit 5 is your report for EPPI SPPI .

(WHEREUPON, Bithoney Deposition Exhibit No. 5 was marked for identification: Expert Report, EPPI SPPI .)

BY MR. ROGERS:

Q. Again, will you take my word for it, this is the whole report that you provided to us?

A. I believe you completely, and I also

have a paper copy here. I thought that would be okay.

Q. You know, that's great, yes. Thank you. So, that's Exhibit 5.

MR. ROGERS: I'm going to mark as Exhibit 6 your report in TPPI.

(WHEREUPON, Bithoney Deposition Exhibit No. 6 was marked for identification: Expert Report, APPI TPPI.)

BY MR. ROGERS:

Q. Do you recognize what I'm showing to you now as that?

A. Yes.

MR. ROGERS: We'll mark as Exhibit 7 the report that you did for VPPI.

(WHEREUPON, Bithoney Deposition Exhibit No. 7 was marked for identification: Expert Report, RPPI VPPI)

BY MR. ROGERS:

Q. Doctor, I'm not trying to be disrespectful to the Plaintiffs. I mean, I'm using their last names, these children. It's just easier

for me to refer to them that way. So, no disrespect intended, but just to move things along.

Do you recognize this as the report for RPPI VPPI?

A. Yes.

MR. ROGERS: And then the last one is the report for DPPI WPPI, Exhibit 8.

(WHEREUPON, Bithoney Deposition Exhibit No. 8 was marked for identification: Expert Report, DPPI WPPI.)

BY MR. ROGERS:

Q. Do you recognize this as that report?

A. Yes.

Q. Okay. So, with that housekeeping out of the way, you -- if I have your -- I'm guessing at your age based on your background, Doctor, but are you -- let's see. Are you around 66 years old now, around that?

A. I'm above 66, but not by much. I am going to withhold comment.

Q. All right. You've been a practicing medical doctor for, you know, 40 years or so, right?

A. Right. If you count residency, since 1976. If you count as an attending physician starting at Harvard, 1979.

Q. And you have had in your past experience -- well, I'll just ask you.

Can you take me through and describe -- I don't want to go through your entire resume, which of course you provided to us and it's some 25 pages in length or whatever.

But can you describe to me what your clinical practice as a pediatrician has been starting with when you were a -- doing your internship or your residency and take me up through the present.

I'm looking for your actual clinical practice as a pediatrician, please.

A. I understand, and I will be responsive.

But I want to mention that my interest in lead poisoning started before that. When I was 18 years old, I took a job measuring all the lead levels in the State of Massachusetts in a laboratory at Boston City Hospital. I measured every capillary and venous lead level drawn in the state during the time that I was working there.

And I also used K-shell XRF to evaluate paint. I'm not an expert. I haven't used it in years, but I have experience with it. The real expert, of course, is Dr. Specht.

But I began after graduating from Harvard College magna cum --

Q. Sorry, Doctor. I don't mean to interrupt you, but that's going to prompt a couple of years that I want to ask you now. So, please bear with me.

For what reason were you doing blood lead level tests at Boston City Hospital during the '70s?

A. It was an employment.

Q. I get that. I mean, but what was the -- why was Boston City Hospital doing blood lead testing at that time?

A. Well, they were the State-sanctioned lab for lead screening.

Q. I see.

A. And a job became available through the Harvard student employment group. And since I had an ongoing interest in lead even before I was 18, I applied for that and was hired.

Q. Why did you have an ongoing interest in lead before you were 18?

A. Well, I grew up in the inner city of Boston, and we actually had kids in our neighborhood who experienced lead poisoning.

Q. What neighborhood?

A. The area of Roxbury Ford/South End.

Q. When did you lose your Boston accent?

A. I'm glad to hear that you don't think I have it any longer. Sometimes I lapse into it. I don't know. Maybe on the day I went to Harvard and people started making fun of me.

MR. STERN: By the way, just for the record, I object. I think he has a pretty pronounced Boston accent, and in all of the times I have spoken to him, I've heard more Will Hunting than I have really any other character in a movie and, you know, I don't appreciate you saying he doesn't have a Boston accent.

MR. ROGERS: Well, since Will Hunting and Matt Damon actually grew up in Cambridge, he doesn't actually have a Boston accent. But be that as it may.

BY MR. ROGERS:

Q. The Boston accent, I had a similar experience, Doctor, I went to law school at GW down at DC. Of course, I had colleagues from all over, but a lot of classmates from all over. But they tried to cure me of my Boston accent, but I don't think it took. I'm not sure.

A. I lapse into it at the Red Sox games.

Q. All right. Did you or any member of your family experience any lead poisoning or any experience with that while you were growing up in Roxbury or South End?

A. I -- not members of my family. I often think that I was affected adversely because I remember eating colored paint chips that were sweet. But I think I still wasn't deeply affected.

So, but that -- when I learned about lead poisoning, going to the lead poisoning lab, I recalled that I had eaten some paint chips. Perhaps. They may or may not have been leaded.

But, in any event, I still graduated from Harvard and Yale. So, I can't say that I was lead poisoned. But that whole -- the whole idea of lead poisoning captured my interest.

I would say that I was not lead

poisoned. I have no evidence that I was ever lead poisoned. But the fact that kids in my neighborhood got poisoned, a couple, made it of interest to me.

Q. The kids that you knew in your neighborhood who were lead poisoned, how is it that you found out about that?

A. It was a discussion amongst parents. It was two kids over the first 18 years of my life. So, I don't really have recollection. As a 10-year-old I wasn't sophisticated enough to know any more.

Q. Is that the period of time that you learned about the other kids?

A. It was roughly then, yeah, when I was cognizant of the world at around 10.

Q. So, the KXRF machine, are you saying that Boston City Hospital had such a device back in the '70s?

A. They had. They measured it, used it to measure lead paint.

Q. I see.

A. Not bone. I'm sorry.

As you know, there is a PXRF, a

portable, and there is a K-shell XRF. The K-shell XRF is the low energy version, and that's what I used. But, at any rate, we didn't do bone lead.

Q. That's what I was going to ask you.

So, the KXRF that was used to evaluate the lead content in paint at that time, that was not a portable unit. Is that correct?

A. Right. It was in the hospital.

Q. Do you know, do you have a memory of whether or not back in the '70s, when you were doing these lead blood tests, blood lead tests, Boston City Hospital and/or the Commonwealth of Massachusetts maintained any databases or statistics concerning the blood lead levels that were measured?

A. I don't know if the Commonwealth did. I know that we entered our data and submitted it. And as a lab technician, once it was submitted, I must admit I didn't track it. I assume there was a database, but I shouldn't really assume even that. I handed the data off to the physician in charge of the lab.

Q. So, was the protocol that pediatricians or other medical doctors from around the

Commonwealth would send the patients to Boston City where the blood was drawn and then tested?

A. No, they would draw the blood in their offices or in other labs and send it to Boston City.

Q. I see.

A. As a reference lab type.

Q. Thank you.

A. It's a so-called CLIA lab, a certified laboratory.

Q. Do you know what the level of detection was back then?

A. 25 was an area of concern in the '70s.

Q. Well, I wasn't asking about the area of or the level of concern. I was asking you about the technology of the blood lead devices that were measuring the content of blood lead. What was the level of detection back then?

A. We used atomic absorption spectroscopy, which is considered a gold standard as far as I know. And the error rate was plus and minus 1 microgram per deciliter as we understood it back then.

Atomic absorption spectroscopy has been

used for decades. You know, there's a certain -- you shoot -- you shoot x-rays or whatever at a sample and it results in the electron losing its energy. There's a wavelength generated. We measured the wavelength that was generated by the lead atoms.

Q. If there was plus-minus 1 microgram per deciliter standard of deviation, what was the level of detection, meaning if it was below a certain amount, would it be reported as less than?

A. Well, now you're going back to the '70s. I was having trouble with 2014.

I'm not sure.

Q. Okay.

A. I'm sorry. It was the 1970s.

And I believe the plus and minus 1 is something that I've read about over the decades, but I don't recall measuring the standard deviation in the '70s.

Q. Okay. So, thank you for that. And now if you wouldn't mind continuing. I had asked you the question about your clinical practice as a medical doctor over the years.

A. Well, as I mentioned, I did my residency

at Yale New Haven Hospital, and it's an inner city hospital in New Haven, and so we had a lot of lead poisoned kids and treated a number of hospitalized kids with severe lead poisoning with numbers exceedingly high, in the 70s, 80s, 100 micrograms per deciliter. I don't know how many. Probably a handful at that high level in three years. Maybe three. But I had an interest in it.

I was hired in 1979 to join the faculty at Harvard and within six months I was promoted to run the faculty practice, the Harvard pediatric faculty practice, on site at Boston Children's Hospital, which is routinely rated the number one children's hospital in the United States for decades, by the way.

But I was running the practice located on site. I was also in charge of training residents to deal with lead poisoning, for example.

And in my work starting in 1979 or the first few months of 1980, I was assigned to supervise the lead poisoning clinic.

I'm sorry. I'm not sure. My screen has altered to show a telephone. Should I keep speaking?

Q. Yes, that's okay. That will happen periodically. It just means that somebody is shifting to different means of listening in. So, Don't sorry about it.

A. I see. I didn't want to drop off and keep talking.

So, starting in 1980 through 1996 I ran that lead poisoning program. We had 32% of all the children in the City of Boston in our practice, very large program.

While I was there, I also started the program for homeless children. I started a teen pregnancy program. I started child development programs. I started high risk infant follow-up programs, lead poisoning program, a number of programs for poor children.

And because of that work, several years later, in 1991, the American Academy of Pediatrics asked me to write their book "Serving the Underserved," which was a way of -- the standard book for training residents to deal with poor children.

So, I wrote -- well, there were 27 chapters essentially describing what happens with

poor children and their problems. And the Bureau of Maternal Child Health and the American Academy of Pediatrics sponsored that because they thought that I was perhaps one of the top experts in the United States on working with poor children.

I probably saw ten children a week -- a week for those -- for the first 20 years of my practice with elevated lead levels. So, you might say that, well, that's 10,000 children, but really they were seen two or three times. So, it's probably somewhere between 3,500 and 5,000 children during those first 20 years.

It's a lot of lead poisoning work, needless to say. I'm not sure how detailed you want me to get into it.

I'm very proud of that work and having been recognized as the person that the Academy of Pediatrics wanted to write the textbook for training residents, "Serving the Underserved." And during the '90s, more than half the pediatric residents in the United States were trained using that book and specifically about lead poisoning.

After that, I got a job at Brookdale University Hospital and was made a professor at the

State University of New York.

Brookdale is a very large hospital with I'm going to estimate 100, maybe 200,000 outpatient visits a year. We had lead poisoning programs there that I supervised and worked on. And then in -- so, I was senior vice president for medical affairs there.

And then in 1999 I was appointed chief -- physician in chief I guess is the title, physician in chief of St. Joseph's Children's Hospital in Patterson, New Jersey, which is a community very similar to Flint.

And, by the way, the Brownsville section of Brooklyn where Brookdale is is also similar in character to Flint. Bedford, Stuyvesant, Brownsville.

But while at St. Joseph's Children's Hospital, that was at that time the biggest children's hospital in New Jersey. So, I was physician in chief there and continued to see lead poisoning patients there.

In 2003 I was offered the job to run a five-hospital system in inner city Philadelphia, and I took that job and continued to see patients

at that time through 2005.

2005, I was asked to be vice dean of New York Medical College. That's the clinical dean, not the research dean, but the person in charge of clinical medicine, for a nine-hospital system that had entered bankruptcy. I joined the system the week it entered bankruptcy.

I had had a history of helping hospitals to do better financially and clinically and to attain bonuses for good clinical work.

So, at St. Vincent's Hospital, I entered in the week they went into bankruptcy and left the week that they exited bankruptcy with a job concluded and they were making money.

At that point, one of the -- I mentioned it was a nine-hospital system. One of the CEOs of that system asked if I would -- he had been named president of Grady Memorial Hospital here in Atlanta, which I believe, and I may be wrong, is the second biggest safety net hospital in the United States. I believe Parkland in Dallas is bigger. I may be off. But it's a huge system in the heart of Atlanta taking care of poor patients, almost exclusively Medicaid patients and the like

or uninsured.

And I was hired to do that by the CEO who had just taken that job. The night before I was about to begin, I got a message from the CEO that the board wasn't going to let me start. It turned out that they didn't want me to start because they planned on firing the CEO who had given me a signed contract.

(Clarification requested by the reporter.)

BY THE WITNESS:

A. I never began working there as the chief medical officer because it turned out they wanted to fire the person who had hired me with a contract.

So, I was hired, though, for about ten months or so to be a consultant and this was just a challenging time. But at any rate, I did that.

And then subsequently -- let's see. I went to -- I believe I went to -- when I was in Philadelphia, I worked for Catholic Health East, a large hospital group, and they wanted me back thankfully. And, so, they hired me to be chief medical officer for Mercy Health System in

Springfield, Massachusetts. And while we were there, we were named one of the 100 top hospitals in the United States for three consecutive years.

After that I became a consultant. Because we had been so successful in improving care, decreasing mortality, decreasing morbidity and specifically pediatric care as well as adult care, Thompson Reuters hired me to be their national medical leader and we did consulting around the United States on those issues, improving clinical care.

Did that. Thompson Reuters was sold to Truven and then sold to IBM and a large part of IBM Watson comes from our work at Thompson Reuters and it's used around the United States, indeed around the world, to improve clinical care.

Q. Okay. I can see a pause there. So, does that complete your answer on your description of clinical practice?

A. I think so unless you have questions.

Q. I do. I have some follow-ups, but they relate to part of your descriptions of the first 20 years of your practice and at Boston Children's Hospital in particular.

If I heard you right, you said something to the effect of that you saw at Boston Children's Hospital 32% of the children in the city. Was that for lead or?

A. No, no. It was primary care practice.

Q. I see.

A. I was in charge of general pediatrics and primary care. So, that's why I had the teen pregnancy program, homeless program, child development programs, all those things that related to the lead poisoning program.

And the lead poisoning program was called the lead poisoning program. It was really a clinical toxicology program. So, we looked at all toxins.

Q. So, what I was trying to get at is, were you saying that you saw 32% of the children in the city as a pediatrician for all purposes or just for toxin and poison evaluation?

A. The Harvard faculty practice that I manage, which had dozens of people who were clinicians, was in charge of seeing 32% of the children in the City of Boston.

Q. I see.

A. So, it was a group, and I was proud to be named the clinical leader of that group.

Q. Yeah. But that would include for all purposes, treatment of all conditions, not just toxin and poisoning, right?

A. Yes, that's true. While I was in charge of the lead poisoning clinic, I had an abiding interest in lead poisoning. That's why I mentioned the 18-year-old laboratory technician. And, so, I had a special focus on that. So...

We broke into subgroups and my subgroup had several thousand patients in it. Anybody that had an elevated lead, I took care of even outside of the toxicology program.

Q. Gotcha. And the textbook on pediatric training for poor kids that you described, what was the exact title of that book, please?

A. It's called "Serving the Underserved." I believe --

Q. Is that --

A. I believe we coined that phrase, although I'm not sure. It's been used many times since.

Q. Is that --

A. It was published under the auspices of the American Academy of Pediatrics and the Federal Bureau of Maternal and Child Health.

And it's about 70 or 80 pages perhaps. If I said the word "textbook," I think that's a bit grandiose for an 80-page monograph.

Q. I don't know if you did. I might have added that in there in my question.

But in any event, is that still in print?

A. No. We sold 5,000 copies. Every copy that was printed was bought, which is considered a blockbuster in the world of pediatrics, believe it or not. 5,000 copies, you're like -- I don't know. I don't know. You're like John Grisham, to use a lawyer who is famous.

Q. Let me ask about your legal consulting work or sometimes called forensic work.

When did you start doing any consulting for lawyers?

A. I did the first consult probably in 1980.

Q. And have you been doing it since?

A. Yes. And I was -- I've noted and kept

track of how many trials I've been involved in. Probably about 18 trials in 40 years.

And probably fewer depositions because a lot of the work has occurred in New York City, New York State, when I was dean of -- well, I'm going to say dean -- recall I said vice dean for clinical -- of New York Medical College and at Brookdale University Hospital in Brownsville and Bedford/Stuyvesant.

So, I have probably done fewer depositions than 18. Maybe 10. You're probably 11 or 12 today.

Q. When did you start working with Mr. Stern and his law firm? You told me many years, but do you have a recollection of when that work began?

A. Well, I met Mr. Konigsberg in 1999, and I did the first case with them in 2000; and I believe Corey came -- I believe -- I don't know how many years Corey's been around. He's been around forever. I don't know how many years he's been at Levy Konigsberg, but however many years he's been there I've worked with Corey as well.

Q. He's a young fellow compared to you and

I, Doctor. He hasn't been around that long.

A. Yes, but you both look remarkably good to me.

Q. How many cases or -- yeah, cases -- do you think you have worked on for the Konigsberg law firm since 1999, Doctor?

A. I was asked not to guess, so I'm not going to say. But it's --

THE WITNESS: Can I guess, Corey Stern? Give an estimate?

MR. STERN: Sure. Sure. Go ahead. Just because Dave looks so good today.

BY THE WITNESS:

A. I would say maybe 20.

BY MR. ROGERS:

Q. 20?

A. Yeah. It's certainly not 100. So, I'd guess 20, but plus or minus a few.

MR. ROGERS: All right. Let's take a two-minute break or five if we want. We have been going about an hour. I usually need honestly a bathroom break for too much coffee after an hour.

So, let's take a five-minute break. We'll reconvene at, let's say, ten past 10:00 and

then we'll continue on.

Doctor, I'm going to start to ask you some more questions about treatment of kids with lead poisoning. So, just to gives you a heads-up. That's where we're going next. Okay?

THE WITNESS: Okay.

THE VIDEOGRAPHER: The time is 10:05 a.m., and we're off the record.

(WHEREUPON, a recess was had from 10:05 to 10:11 a.m.)

THE VIDEOGRAPHER: The time is 10:11 a.m., and we're on the record.

BY MR. ROGERS:

Q. All right, Doctor. As a clinical practitioner pediatrician over the years and as you described in your experience, you've had the opportunity to diagnose and treat children with lead toxicity or lead poisoning many, many, many times, right?

A. Yes, sir.

Q. Could you describe to me the process by which lead poisoning or lead toxicity is diagnosed?

A. Well, it's diagnosed via blood sample. Also sometimes parents bring their children in

concerned about lead toxicity. They may have eaten a paint chip or they notice -- they know that there is chipping paint in their home and the children is crawling in lead dust.

But routinely it's diagnosed on screening. There are screening programs in most areas that are high prevalence. And when those levels come back as elevated, they're treated for -- appropriately for lead intoxication and poisoning.

Q. Is history, taking a history of potential sources of exposure important in a diagnosis?

A. It's done routinely.

Q. Is that what you did routinely?

A. Yes.

Q. When you say "blood samples," you mean blood lead levels of the type that you had described earlier?

A. Yes. And also other samples, not just blood lead, but sometimes zinc protoporphyrin, free erythrocyte protoporphyrin may be used as adjuncts, and also we look typically at hemoglobin, hematocrit, the size of the red blood cells, which

is affected by lead, often we'll get iron levels, et cetera, because sometimes we treat children who are lead poisoned with iron, for example, to ameliorate the effects of lead.

But there is a lot more to it than that. There are a number of lab tests you can use.

Q. In terms of the screening programs that you described, what does that -- what were you referring to?

A. Well, for instance, in the Commonwealth of Massachusetts, in the time I was there, and we were in inner city Boston, we were required -- I don't know if it's a law or some kind of mandate, but I knew the word "required" was used -- that we screen children at 6 months, 12 months, 18 months, 24 months, 36 months and 5 years of age because the prevalence was so high in the City of Boston back then in the '80s.

And gradually that screening number has come down as lead has become less prevalent.

Q. Did the screening process involve blood lead level testing?

A. Yes.

Q. And you had mentioned that if the levels

came back elevated, treatment would be instituted. What were the levels that would be considered elevated?

A. Well, it's changed over the years, as you know.

So, currently the reference value, the reference value is 5 micrograms per deciliter where clinicians are admonished to intervene at that point.

The U.S. Preventive Services Task Force has stated that that -- that while the CDC called it a reference number, they've actually said that the reason they call it a reference number is that every major body in medicine that deals with pediatrics has attested that there is no safe lead level. So, even a level of 5 is known to be toxic. But that's where intervention typically occurs nowadays.

In the past, interventions, like in the '70s, might have been 25 micrograms per deciliter. Then in the '90s, 10 micrograms per deciliter; and as of 2012, 5 micrograms per deciliter.

And the interventions vary depending on how high the blood lead levels are. So, there are

various types of chemotherapy designed to mobilize lead from the soft tissue in the blood and excrete it in the bile and the urine.

And other times we simply treat with iron because lead poisoning results in an anemia that is problematic, and typically these children also have low iron levels. So, you can decrease toxicity of lead by replacing iron where it's needed.

Q. Since 2012 when the reference value has been 5 micrograms per deciliter and intervention is necessary, would there be any intervention or treatment of a child who had a blood lead level test that was less than 5 micrograms per deciliter?

A. Typically we admonish parents to be aware of issues of lead poisoning if they are living, for instance, in an inner city like we did in -- like we did in Boston.

But we would intervene with a lead level of 3 or 4 only if there was evidence of anemia that perhaps might have been a side effect.

But we routinely advise parents, for instance, on how to clean their homes, wet mop the homes using triphosphate detergent, which is the

only one that seems to pick up lead when they're cleaning, vacuuming the window sills, having lead inspectors come by the house if they're concerned, either encapsulating the lead paint or doing a full renovation and remediation. It depends on -- it depends on the level.

Q. All right. For purposes of intervention or treatment, what would be the intervention or treatment of children as of 2012 and into the present who had a blood lead level of 5 to 10 micrograms per deciliter?

A. Well, as I say, they'd be screened probably most importantly for iron deficiency and iron deficiency anemia or anemia that's caused by lead.

The level of 10 is or 5 is really ephemeral because the half-life of lead in the child's body, in the blood, for instance, specifically, had been routinely reported based on adult studies as 30 days.

The half-life of lead in child -- children's bodies seems to be more like 9.9 or 10 days. And there is data from O'Flaherty and also data from Specht and others indicating that the

half-life of lead is quite short in children.

So, we would also -- if somebody had a lead level of 10, I'd bring them back in a month and see what's happening there, because there may well have been a level of 20 the month before.

Q. So, for purposes of treatment, however, the gold standard, so to speak, and the standard of care would be you'd make treatment decisions based on the blood lead level testing, right?

A. Yes.

Q. And then one of the primary interventions that would be undertaken would be to try to identify these potential sources of lead in the child's environment and take steps to either minimize or eliminate those sources, right?

A. That's typical.

Q. And then in addition to that, there might be other interventions that you described, and I'm talking about for children with levels, you know, from zero -- or not zero but from, you know, below 10 -- that would involve potentially iron supplements?

A. Yes.

Q. At these levels, 10 or lower, are there

any other treatment interventions that would comprise the standard of care for a pediatrician as of 2012 to the present?

A. I wish there were because these kids do need intervention, but sometimes the cure is worse than the disease. So, some of the treatments that we have have their own side effects, like Succimer has renal toxicity -- I'm sorry -- kidney toxicity, liver toxicity.

Penicillamine causes allergic reactions and similar soft tissue reactions. Calcium disodium EDTA can have side effects of allergy and kidney function shutdown if the child isn't hydrated actively by IV. British anti-Lewisite is used with very high levels of led when children have levels above 60 or 70.

British anti-Lewisite was a chemical warfare drug in World War I and thank God we found something useful out of it, out of the trenches. It's used when a child is at risk of having brain edema or swelling when they have very high levels.

But at levels below 10 we don't want to use any of these medications. And what we would want to do like if somebody had a lead level of 8

or 7 or 6 or 5, I'd bring them back because it means that they are set up for perhaps higher levels and also they may have had higher levels already.

So, and it's not just the acuity. It's not just the height of the lead level that matters. It's also the chronicity.

So, typically in the past, studies of lead intoxication have looked at the acuity, how high the lead level is, okay, without paying attention to the chronicity, how long the lead level has pertained.

So, later studies have looked at average lifetime lead as opposed to just peak lead. So, if somebody is chronically lead intoxicated, that can have just -- at a low level, that can have just as deleterious an effect as if they had one high level.

But that's relatively abstruse, but it's certainly highly relevant clinically.

Q. So, in terms of the standard of care for treatment of kids with suspected lead poisoning, what is the level at which the standard of care since 2012 would require that they come back for an

additional or repeat blood lead level testing?

A. Well, you know, that varies depending on the locality because different areas have different prevalence.

So, it's -- I mentioned, for instance, in Boston in the '80s we did testing. We're mandated to do testing at 6 months, 12 months, 18 months, 24 months, 30 months, 5 years. As the prevalence of lead went down in that city, we decreased the need for screening. So, we didn't bring kids back as much.

So, there are local standards based on the incidence and prevalence.

Q. What are the local standards in Michigan as of 2012 and to the present?

A. I'm not aware of published standards or published requirements.

Q. What are your recommended standards as a pediatrician from 2012 forward?

A. Children above 5 need to be -- 5 micrograms per deciliter -- need to be followed chronically when they see bumps in their lead levels, but hopefully we'll see them go down.

Again, I would like to treat -- if I had

a non-toxic medication, I would love to treat children at 5 micrograms per deciliter, but I described to you the problematic side effects of these medications.

Q. Right. At what level currently is the medical -- strike that.

Under the current standard of care for lead poisoning or toxicity in children, what would be the blood lead level that would be the minimum necessary for consideration of potential treatment with these various medications?

A. Well, it varies. You know, the calcium disodium EDTA, British anti-Lewisite, that trench warfare drug, talk about a toxic medication coming out of poison gas.

That would probably be above 70 micrograms per deciliter because those are the kids that are at risk for death and brain swelling where the brain would herniate through the base of the skull into the spinal column. You want to get rid of that edema as soon as you can.

The calcium disodium EDTA has been used at levels above 40 for decades. However, over the last couple of decades, we use Succimer typically

at levels above 40. Chemet it's called.

It also is a chelator and removes lead from the body very effectively and is related to some of those neurotoxin medications that we were talking about.

Penicillamine is indeed a penicillin analogue. However, it causes a lot of allergies. So, we've stopped using that. We used to use it at very low levels, like 20 or 25. But we don't use chemical chelation typically below, depending on the clinician, 25.

For instance, I have standards from Harvard Medical School within 10 feet of me that I could easily read to you, but they'd be different in another locality.

Q. Would those be the 25 as the limit?

A. As I say, it varies. It varies by locality. I would certainly consider chelation for children at leads over 25. I might not start at 25. I might -- because of the toxicity of the medications. I might wait and follow that child and use all the potential interventions I can.

So, typically somebody who has a lead level of 25 micrograms per 100 cc's of blood will

typically, in my experience, and this isn't a hard-and-fast rule, have evidence of anemia. If they don't have anemia, they'll have so-called microcytosis, small red blood cells, which is an effect of lead.

Also, you can look at the chronicity of the effect by measuring zinc protoporphyrin and erythrocyte protoporphyrin, which take about three months to get elevated. So, you might take the chronicity into effect, into consideration that way.

I hope that's responsive. This is a complex, multifactorial issue of clinical judgment based on science.

Q. You received information with respect to the four bellwether children about blood lead tests that were performed in the past before you did your review on them, right?

A. Yes.

Q. Did you recommend to any of the parents that any of those children get repeat blood lead level testing?

A. I don't believe so.

Q. Why?

A. I didn't have lead levels at that point that were above 5.

Q. As part of your clinical practice over the years in making diagnoses of suspected lead toxicity or lead poisoning, have you ever ordered a bone lead scan?

A. I have not. I have done -- I typically do x-rays. When somebody has a high blood lead level, we do x-rays of the knee typically. But I haven't ordered bone scans clinically.

Q. What would you -- what would an x-ray of the knee reveal that would be helpful in a diagnosis?

A. Well, when children have elevated lead levels, it interferes with the growth of bone. And as you probably have heard over and over again, lead is what's called a divalent cation and it's similar to --

Q. Hold it. I have to say I haven't heard that one before. You're going to have to explain that one to me.

A. Well, lead is a heavy metal and it's similar in the body. The body recognizes it as a heavy metal, but it also recognizes magnesium,

iron, calcium as lead. They are very similar from the body's point of view. Talk about anthropomorphizing an issue. The body doesn't have a point of view. But from the enzymatic perception that the body has, these heavy metals are all similar.

So, one of the ways that lead causes toxicity is it replaces iron in the bloodstream and prevents the synthesis of hemoglobin and results in anemia and also replaces iron in the brain so that it poisons the rate-limiting step in the brain of the synthesis of neurochemicals, the synaptic communicators within the brain.

It poisons monamine oxidase, which is the rate-limiting enzyme in the synthesis of things like serotonin and noradrenaline, things that allow the brain cells to communicate inside the brain.

In the heart of monamine oxidase is an iron molecule, but when you have high lead levels, that iron molecule gets replaced by lead and is poisonous to the body.

So, those are all divalent cations.

I'm sorry. Now I've lost the train of what your question was because I got so interested

in what I was saying.

Q. Yeah, you were describing why an x-ray of the knee would assist in a diagnosis of the patient.

A. Right. Thank you for reorienting me.

Typically in growing children, calcium is being deposed at a so-called growth plate in the bone, and that growth plate has within it something called the line of provisional calcification where calcium is being deposed into the bone and this results in the child gaining in height.

So, as the child keeps putting bone, the deposition, to use a funny term given that we're in a deposition, but as the deposition of calcium progresses, children get taller.

What happens when someone is lead poisoned is instead of having calcium deposed, one has the poisoning and the lead is deposed there. There is a toxicity. And it's really not the lead. It's an inflammatory response.

So, not to get into it and not to make too fine of a point, you can see I can tend to get bogged down in some details.

But that line of provisional

calcification becomes more and more visible, and you can tell when there is toxic levels of lead because that growth plate becomes more visible.

Q. I see. At what -- sorry.

At what blood lead levels would you -- would the standard of care in your view indicate that an x-ray of the knee should be taken in patients suspected of having lead toxicity?

A. I would say at 20, but that would be my standard. Again, I think that people vary.

Q. Okay. All of those effects or the biological process I guess that you were just describing in your answer to my question before in terms of lead and where it goes in the body and the effects that it has in the body, do those effects take place right away, that is, soon after the exposure to lead?

A. Well, the biochemical effects do take effect right away. That's why, for instance, within three months of lead exposure you can see elevated zinc protoporphyrin or free erythrocyte protoporphyrin. And that's -- that's a biochemical effect.

Hemoglobin consists essentially of a

ring. There are four moieties, four groups, almost like a cross, that join together with iron in the middle. And that forms the ring structure with iron in the middle holding the four moieties together.

In the presence of lead poisoning, that iron atom in the center of the heme ring that is the basis of hemoglobin is replaced by lead; and those four moieties, which should come together around the iron, the four parts of heme, break down and enter the blood immediately as so-called free erythrocyte -- they're called protoporphyrin rings. They enter the blood as protoporphyrin or free erythrocyte protoporphyrin, and that begins immediately.

And there is some effects at very low levels, for example, and there is also effect on the brain where there is poisoning of monamine oxidase that occurs.

Depending on the level, we also think that there is poisoning of the calcium channels in the brain. We don't think it. We know it. That affects the rapidity of the electrical stimulation across neurons.

Lead begins to affect myelin deposition over a period of months. Myelin is a covering of the nerve cells and the myelin sheaths are made of myelin cells, and those cells actually cover the nerve cells, nourish the nerve cells, protect the nerve cells from damage, and also increase the speed of transmission of the nerve cells' electrical impulse.

Perhaps I should just discuss this a little more.

Nerve cells, as you know, are present in the brain obviously and they are typically a long axon it's called. And that axon -- can you see my arm?

Q. You have to go a little bit higher up.

A. There is a long arm of the axon. Okay. And that's covered in a myelin sheath, where the myelin sheath nourishes the axon, nourishes the nerve, and increases the speed with which the electrical impulse can go down the length of the nerve.

Lead also interferes with the flux of calcium across the membranes in the arm of the axon. As I mentioned, calcium and lead are both

divalent cations, so the body recognizes lead as calcium. So, all of a sudden when calcium can't cross but you've got lead, it slows down the axon's electrical firing. Lead itself slows the excitatory phase, the exciting phase of neurostimulation.

Again, also lead takes -- at the end of my arm you might find fingers, and each nerve cell has hundreds of fingers that reach out and almost touch another 100 or many more than 100 nerve cells.

And when the electrical impulse flows down the arm of the axon and it enters the finger, and the fingers have within them so-called neurotransmitters like serotonin that we were mentioning before, the electrical impulse results in the fingers releasing neurotransmitters that then go and stimulate hundreds of other cells to be excited and fire. And that results in the fireworks, the awesome fireworks, of intellectual thought and brain function. Since lead poisons the synthesis of the neurotransmitters, that's another issue.

It also poisons the mitochondria in the

nerve cells and in all cells. Mitochondria exist in each individual cell in the body, and they are responsible for providing all energy in the body.

So, when you interfere with the mitochondrial action, you find that brain cells don't function as well. They don't fire as rapidly. Other cells in the body slow down.

Part of it is a true intoxication. I mean, we typically think of intoxication as ethyl alcohol or whatever. But there is true intoxication of the cells.

There are other effects. I have access to dozens of them here, but I don't think you'd want to get into them.

We know that it's toxin, it's a poison and it affects the body in many ways. There are immediate biochemical effects and immediate neuronal effects that result in slowed brain functions.

And that's part of why children at elevated blood lead levels essentially think more dully and are seen more intoxicated or foggy than other children.

Q. And my question was really related to

the timing or the sequence of how long those effects would take after the lead exposure begins, and I think your answer was rapid or very soon. Right?

A. The biochemical effects can occur very soon. There is immediate toxicity.

There is an enzyme called ferrochelatase or heme synthetase that we were talking about that is an iron-dependent enzyme that assembles those four parts into a ring, and that enzyme is iron-dependent and it puts the iron in the middle of these four groupings that and fuses it together into a ring.

Poisoning of ferrochelatase, also called heme synthetase, occurs immediately and it's dose-deponent. You know, if you're looking at causation, that's one of the criteria. It's a dose-dependent poisoning.

Q. Let me -- sorry. Go ahead.

A. The effects on myelin are slower and vary with the age of the child. But the ferrochelatase and monamine oxidase, there is immediate effect.

Q. How long does the effect on the myelin

and the axons take?

A. Well, it depends on the age of the child.

Q. Children under age 5.

A. I don't want to answer incorrectly. My recollection is months.

Q. And months meaning how many months?

A. I'm not able to say exactly. I'd have look at my textbook.

Q. Okay. What textbook would you look at to determine that?

A. Well, a pediatric toxicology book may have it, a standard textbook of pediatrics may have it. I have multiple publications concerning that at my fingertips, which I don't think you want me to go searching through.

Q. Not at this time.

I want to ask you some questions about the opposite side of this issue that we have been discussing in terms of timing.

And I think you mentioned that for children, your understanding and your opinion as to the half-life of lead, in the blood anyway, is shorter in children. It's about 9 or 10 days. Am

I correct so far?

A. Yes.

Q. Okay. And if the source of the lead for that particular child is no longer there, that is, the child is not ingesting or getting lead into their bodies that makes its way into the blood, the time over which the lead would be reduced to zero is dependent upon the total amount of lead that is there in the blood when the exposure ends.

Am I right so far?

A. Well, I think it's more complicated than that.

Q. Go ahead and explain, then.

A. Well, there's a so-called triphasic elimination mode of blood lead and there is also within that another variable, and there is a three-compartment mode, a two-compartment mode of elimination and a one-compartment mode of elimination.

So, to discuss it, if somebody is lead naive, has not had any lead before, the lead enters the blood and the half-life can be in the order of one day and it goes away. And then if that child intermittently takes a tiny amount of lead in, the

blood lead level continues to be one or two days.

If there is more chronic ingestion, that means the lead doesn't just stay in the blood. It goes into the soft tissues, the liver, the kidneys, the brain, every soft tissue, the muscles, poisoning the mitochrondia, for instance, the energy cells in the muscles, poisoning the energy cells of the neurons, that's a so-called two-compartment model that pertains when the lead is not only in the blood but also in the soft tissues.

So, that elimination phase probably is about a month to get rid of the blood from the soft tissue.

What transpires with chronic low level ingestion is that that blood lead goes down, but it doesn't go out in the urine in any great amount or the bile in any great amount. It gets deposed in the bones. So, that's where the accumulation is. So, ultimately over 90% of the lead ingested gets into the bones. And, so, the bone lead level is a marker of how much toxicity a child, how much lead toxicity a child has been exposed to.

So, for example, in a kid like A[redacted]

T[redacted], I believe, and please don't hold me to this, but I believe her bone lead level in her tibia was 9.62 micrograms per gram of bone. That's what Dr. Specht found.

A child of A[redacted] age has a little bit less than 1 kilogram of bone mineral. I know the child is big. I'm not talking about the bone itself. I'm not including the bone marrow, which weighs a lot, but it's kilogram of bone mineral.

So, that child, A[redacted] T[redacted], several years after exposure to water, had 9,000 -- 9,000 -- 9.62 micrograms per gram of bone in her bones.

In the child's entire body -- I'm sorry. I'm being distracted by some changes in my screen.

In that child's body, that means that she presently has 9,620 micrograms of lead in her body. And, as you know, we're concerned about 5 micrograms as being potentially toxic in the blood or 1 microgram and this child had 9,620 micrograms.

Given a half-life, according to some of the studies that we have seen, a half-life in the bones of two years in a growing child, because remember that line of provisional calcification

where the bones are growing when you're 5 years old. Adults don't have that. The bones aren't growing. But children's bones are turning over rapidly.

So, what that means is two years ago A[redacted] had 19,000 micrograms of lead in her bones. In two years before that, she had 38,000 micrograms of lead in her bones. Now, that exposure, and this is what's in her body now, is a huge amount of lead.

There are studies, for instance, from Nie, N-i-e, coming out of Boston Children's Hospital, the program where I used -- that I used to run, which show that -- well, they looked at 11 children that had lead levels greater than 30 micrograms per deciliter, which everyone agrees is pretty severe toxic exposure to lead, and they looked at those kids roughly eight or ten years later.

These kids initially were poisoned as toddlers and the average age was around 10 when they were given a tibial bone scan. Those kids had lead levels on average of 0.7 micrograms per gram of bone. I don't know. If you multiply that

times -- to get to 9.62. It's many-fold lower than what A[redacted] T[redacted] has, even though they initially had blood lead levels greater than 30.

So, this implies a very severe level of intoxication that was chronic and that was masked by ongoing deposition of lead into the soft tissues and into the bones.

And as I say, it can be masked in different ways at different times of exposure with the initial exposures. The lead can disappear in two days. Later it can disappear in a month. Later it can disappear in 20 years if you're an adult. But two years is the half-life for a 5-year-old.

So, A[redacted], for example, and all the children had very high levels of lead, definitive levels of lead in their bones, indicating ongoing exposure, which we missed in our blood lead measurements, but you can't argue with the fact that tens of thousands of micrograms of lead are in this child's bones.

Q. Thank you for that explanation, and I do have some questions about that subject later when we get to your reports where you talk about the

bone lead.

But did I understand you correctly that your opinion, based on the literature and your own experience, is that with respect to blood lead levels anyway in children of this age group, you know, in the 5-year-old age group, that the half-life is about nine to ten days? Is that correct?

A. Well, Specht's data, for instance, Aaron Specht's data was 9.9 or so plus or minus 4 days. There are other similar studies.

Q. What's your opinion?

A. Well, my opinion is that that's correct. You know, in adults, all that data about the half-life being 30 days, most of the literature is always focused on adults where the half-life of lead in the blood is 30 days and the half-life of lead in the bone is 20 -- I'm sorry -- 20 years in soft bones like the base of your skull and 30 years in hard bones in the tibia and the femur, hard bones like that. But the child data is very different because there is an exuberant growth period.

I'll give you an example. Another study

out of Harvard showed that an adolescent girl that they saw who had been lead poisoned before who had no evidence of lead poisoning went through a very rapid growth spurt and became lead intoxicated once again.

She went through a growth spurt that was not dissimilar to what a 5-year-old would do at puberty and all of a sudden she became lead poisoned. That's because all the lead was still -- was in her bones.

MR. STERN: Hey, can you all hear me?

MR. ROGERS: Yes, we can.

MR. STERN: I'm sorry.

(Clarification requested by the reporter due to audio difficulties.)

MR. ROGERS: This is Corey Stern, but now we cannot hear you, Corey.

THE VIDEOGRAPHER: Should we go off the record?

MR. STERN: Hey, Dave.

MR. ROGERS: Yeah, let's go off the record for a minute, yeah.

THE VIDEOGRAPHER: The time is 10:47 a.m., and

we're off the record.

(WHEREUPON, a recess was had from 10:47 to 10:52 a.m.)

THE VIDEOGRAPHER: The time is 10:52 a.m., and we're on the record.

MR. STERN: This is Corey Stern. I just want to say on the record that my Internet connection fell off at roughly 10:33 a.m. Eastern time, and I was able to reconnect at 10:47 a.m. Eastern time.

I don't anticipate that there was any issue with the testimony or the examination by Mr. Rogers. But when the deposition is finalized, I'll just take a look at that period of time; and I reserve the right if there was something objectionable, to raise the objection in light of the technical issue I had via Zoom.

BY MR. ROGERS:

Q. Doctor, I'm going to turn to sort of some housecleaning type questions, and I think we can move through this quickly, having to do with the work that you did or the documents that you looked at and so forth. Okay? So, here we go.

Since the time when you completed your reports, July 25 of 2020, for the four bellwethers,

can you describe to me what else, what other work you did on the case?

A. Well, in preparation for this deposition, I have spent hours trying to prepare for your questions, looking at the literature on bone lead and blood lead and the half-lives associated with them and reviewing some of the toxicology literature, reviewing some of the literature on cognition, looking at the impact of lead in water on children's cognition.

I probably spent 20 hours trying to get ready to have this discussion. Even though I looked at a lot of it before I made the preparation -- made my reports, I still wanted to look at it again so that I would be able to answer your questions appropriately.

I had met with Michael Weitzman, who is a long-time friend, 40 years. He was in the Harvard practice and left the year before I took over and went to Boston City Hospital. But we never discussed the bellwether cases.

The only work I've done on the bellwether cases, other than I just described, would involve talking to Corey, talking to his

paralegal, Ashley Vioux.

I asked one of Michael Weitzman's graduate students to geomap where the four bellwether children lived.

And I also had a discussion with Dr. Specht initially about bone lead in general, and then I asked him about the four bellwethers, if they -- if those numbers were significant.

So, that's pretty much it.

Q. The 20 hours of literature review that you did, the literature that you did review, are those listed anywhere or referenced anywhere that I could look at them?

A. Well, I sent you -- I sent to Ashley, I thought they would be forwarded to you, a list of 34 or 35 documents.

Also I had a Dropbox from Ashley and Levy Konigsberg, and I forwarded multiple documents to Ashley for forwarding to you. If you haven't received them, I'm sure Ashley will send them to you. But it's a fair number of articles.

Q. Okay. I think we did receive those. I will check on all those.

A. So, some were typed references. I was

given a day and a half to type up the articles that I reviewed, and I did the best I could. Please excuse the typos. I don't have -- didn't have a secretary for this.

So, that was like 34 citations that I typed up, and then there were others that I could send to you electronically.

Q. Got it. The discussion with Dr. Specht, did that -- when did that take place, to your recollection?

A. Maybe three weeks ago.

Q. Do you know if that was before or after his deposition took place?

A. I'm sorry. I don't have -- I don't know. I didn't -- I don't recall just when his deposition was. And if you told me a date, I still wouldn't be able to help you.

Q. The information about where the four bellwethers lived in terms of a geomap, is that a document, that map, you know, pinpointing where they lived, is that a document that you received?

A. I believe I do have that -- (audio pause) -- yeah. But the main point is that they didn't lived in Wards 5, 6 or 7.

Q. Okay. You faded out there, Doctor. He we lost the connection for a minute.

A. I was --

Q. Hold, please. Let's just make sure we do this in sequence just so Corey Marut gets the testimony.

Would you just repeat your answer about the geomap?

A. The children when we mapped -- when the graduate student mapped them, they didn't exist in -- they didn't live in Wards 5, 6 and 7, which were initially thought to be the highest lead level areas of the -- lead levels in the water.

Q. The map itself, was it a map of Flint that showed -- broke down what the different wards, the division for the different wards were?

A. Well, I believe so. I'm not sure as I sit here. It was a map of Flint. It wasn't huge. And we put the addresses of the bellwethers on the map and then geomapped them to what was in Hanna Mona Attisha's paper.

Q. Did you draw any conclusions from that work in looking at the addresses and what wards they did or didn't fall into?

A. Well, I don't know the names of the wards. I can tell you that I have great suspicion about the lead levels as measured in the water, as I'm sure you'll ask me about soon.

But they did not live in Wards 5, 6 or 7. They lived in areas which had on average about 20% of the lead pipes having levels greater than 15 micrograms per deciliter. That's my recollection.

Q. Would you say that again because you said lead pipes. I didn't follow your answer. Sorry.

A. All right. They lived in areas where 20% approximately of the water that was tested in Hanna Mona Attisha's article, 20% of those pipes or wherever she got the water -- now that I am thinking carefully, I believe -- I don't know. But it was 20% had lead levels greater than 15 parts per billion. That's the average for the four bellwethers.

I have great suspicion about that mapping of the water system and I don't believe it for a minute.

Q. Explain to me what you mean.

A. Well, if you look at -- can I look at

one of the papers like SPPI [redacted] I have right beside me? I'll tell you why in a second.

But Congressman Kildee in 2019 noted that while initially people thought that -- I am being approximate because I am trying to find it -- 14,000 lead pipes or pipes needed to be replaced. I'm sorry. I want to get it right.

By 2019 they had decided that that was 100 percent in error, that it needed to be closer to 30,000 pipes that needed to be replaced.

I'm sorry. I'm having trouble finding it, but I believe you know what I'm referring to in my report.

So, there was a 100 percent difference between what was initially thought to be the problem with Mona Hanna-Attisha's geomapping of the areas and the lead levels in the pipes in that area and what the FAST program ultimately decided to do, which was to more than double the numbers of pipes that needed to be replaced.

I'm sorry. I'm having great difficulty finding it.

Q. All right. So, as I understand you, though -- we'll get to that a little bit later,

Doctor -- but your suspicion relates to which issue, the actual composition of the service lines leading into the houses or the amount of lead that was found in the water when it was tested?

A. I'm suspicious of all the data presented on the lead in the water, because when the FAST program looked at what pipes needed to be replaced, they had to double the number of pipes that they needed to be -- needed to be replaced.

The other thing that I'm concerned about is that essentially we're looking ex post facto. These children are essentially canaries in the coal mine, because if you look at what was presented in the 60 Minutes study about child development and kids needing special education last year on 60 Minutes or earlier this year, I don't have the date in front of me, 80% of the children in Flint required special education at this point whereas in the past it was roughly 20%.

So, the fact that there was a fourfold increase in the numbers of kids requiring special education is quite dramatic.

The other thing that concerns me is there was -- Mona Hanna-Attisha published in the

American Journal of Perinatology in 2020 a paper that I reviewed as a reviewer for Pediatrics.

I'm a reviewer, by the way, for the Journal of Developmental and Behavioral Pediatrics. I have been a reviewer for the Journal of Pediatrics as well as Pediatrics, which is a different journal, and I have reviewed for the New England Journal, et cetera.

But in the American Journal of Perinatology, I believe it was in March, Mona Hanna-Attisha looked at the percentage of children with elevated lead levels in their umbilical cord blood in Flint versus Detroit, and she found a 700% increase in the number of children with elevated lead in their cord blood.

So, that indicates to me that there was a systemic problem throughout Flint, because a 700% increase is certainly important and a 400 -- that's 700% increase in cord blood lead levels in infants who are not eating lead paint, not while crawling on the floor and eating dust, and that 400% increase in special education makes it in my mind much more likely that there were more pipes or water sources that were contaminated than were

initially mapped.

And, as I say, it's the whole water system that I'm concerned about. And these children, you know, if they're drinking water at home, they're drinking water at home that may be tainted. They go to school. They may be drinking water in the school that's tainted. They go to their grandmother's house.

But all of a sudden there was a huge spike in the number of kids who needed developmental intervention and special education, 400% spike and a 700% increase in those require having elevated umbilical cord blood.

Q. That paper, was that the -- was that published in 2020, the spring 2020 did you say, Dr. Attisha's paper?

A. I believe so. It's the American Journal of Perinatology.

Q. Is that --

A. I don't have the month in front of me, but I believe it was -- I'm sure it was 2020.

Q. Is that part of the -- is that on the list of the scientific literature that you provided?

A. I did not provide that. I didn't look at it until recently. I'm sorry. Like in the last week.

I had thought that I was enjoined. I had reviewed it for Pediatrics and as a reviewer, although I was well aware of this data in 2019, as a scientific reviewer and peer reviewer, I was enjoined not to discuss the paper. So I didn't include it in any of my work.

I only this week learned that that paper was published and that removed the injunction from my discussing it. So, that's why I'm able to discuss it today. If we'd had that discussion two months ago, three months ago, I couldn't have discussed it.

That's why it doesn't appear in anything because I thought I wasn't allowed to share it. Only now I am allowed to share it. It's part of the scientific review process. I hope I'm explaining myself.

Q. Yeah. The -- okay.

So, getting back to the thrust of the series of questions that I was asking you here is I was intending to make sure that you described to me

all of the work that you've done in between when your reports were written and today.

And so far you've told me about the literature review and the list of those scientific literatures, articles, that you've provided with the articles themselves, Dr. Attisha's paper, Mona Hanna-Attisha's paper that you just described, the discussion you had with Dr. Specht about three weeks ago and the geomap information for the four bellwethers that then led you to describe to me your suspicion about the water lead levels and so forth. So --

A. Right. To be clear, I also spoke with Dr. Weitzman by Zoom call four times. We never mentioned the four bellwethers. I have known Dr. Weitzman for 40 years. And, so, we just discussed lead poisoning, but none of the bellwether cases at all.

Q. Was that a -- did any of the discussion with Dr. Weitzman assist you or does any of that, the content of the discussion, inform the opinions that you're providing in your deposition here today?

A. Well, I don't want to insult

Dr. Weitzman, but I don't think I learned anything. But I found -- well, Dr. Weitzman is an eminent, if not preeminent, scholar and a long-time friend. So, he is incredibly well qualified and has positions at the EPA evaluating lead blood programs, et cetera.

So, I don't mean to insult Dr. Weitzman. But we were discussing clinical issues of lead, never mentioned the four bellwethers, and I was -- I did it as a matter of gaining confidence.

I consider this the most important case I've ever worked on, and I'm humbled and a little nervous to be working on it. So, I wanted his advice on lead in general. I wanted to be sure I was up to date. And I was pleased to not learn anything.

Oh, Dr. Canfield was also on three of those calls.

Q. So --

A. They were Zoom.

Q. Did you --

A. I say calls and I mean Zooms. Sorry.

Q. Did you learn any facts or scientific information or anything important and that you

relied upon for any of the opinions that you expressed -- you are expressing in the case from these Zoom conferences with Dr. Canfield and Dr. Weitzman?

A. Well, what I learned I learned from Dr. Specht because I wanted to be sure I understood the half-life of bone.

I mean, I had reviewed the literature on the half-life of lead in the bones, but he affirmed for me that the lead levels in the four bellwethers were definitively high and indicated that the children had exposed to large numbers of lead.

And, you know, I'm not used to measuring lead in terms of micrograms per gram of bone, so I wanted to be assured that I understood it perfectly.

Q. Did you ever have -- does that now complete a description of all the work that you've done in between the time that you wrote your report and the deposition?

A. Yes. I probably did about 4 hours yesterday that I didn't mention.

Q. Doing what?

A. In terms of hours. Reviewing

literature.

And you have everything except the American Journal of Perinatology, which I just learned I'm allowed to share.

Q. All right. Did you ever have a conversation with Dr. Krishnan?

MR. STERN: Object to form.

BY MR. ROGERS:

Q. I mean about the case.

A. No. I called her. You know, I was -- this was a rush job because -- I'm not exactly sure why. There were timelines implemented by the Courts, and I really needed to get the reports from Dr. Krishnan as soon as possible so that I could interpret them.

And I did call her because I felt that the timeline was short and I wasn't getting the reports rapidly.

And excuse me. I want to add one other thing.

Levy Konigsberg, Corey and Ashley, sent me rough drafts of Dr. Krishnan's deposition, Dr. Graziano's deposition and Dr. Specht's deposition. So, I did look at those in addition to

this. So, I looked at all of that.

Q. When did you look at those?

A. Well, I was looking at them yesterday, and I looked at Dr. Krishnan's report within the last two weeks. I'm not sure when her deposition was. It was shortly after her deposition.

Q. And among the things that you've reviewed before you did your -- or strike that.

Does that now complete all the work that you've done in between the time that you wrote your report and your deposition today?

A. To the best of my recollection at this point, yes.

MR. STERN: I don't want to testify for him, but he did not mention that in preparation for the deposition he did have two phone conversations with me over the past couple of days, obviously the substance of which are protected. But I didn't want him to miss the fact that we did speak twice.

THE WITNESS: I'm sorry, Corey. I didn't think that that was salient, and I also thought that it was protected for some reason. You can tell how brilliant I am as a legal scholar.

MR. STERN: It is protected. I just -- you

know, just to be complete, so we won't talk about what we talked about, but we did talk.

BY THE WITNESS:

A. Yes, we spent less than an hour each of the last two days, if I recall, 15 minutes yesterday and maybe 45 minutes the day before, talking with Corey specifically.

And I'm sorry for omitting that. I thought that that was appropriate.

BY MR. ROGERS:

Q. Yeah, no worries. The fact that you had the conversation as part of your prep is not protected. The substance of what was discussed is.

But you didn't learn anything from Mr. Stern in your discussions that you rely upon for any of the opinions that you hold in this case that you didn't already know before, do you -- did you?

A. No. Corey is a brilliant guy, but he's not the world's expert on lead.

Q. I suppose I should move to strike part of that answer, but I decline.

A. I'm sorry. I didn't mean to be flippant. Please excuse me. If that was

insulting --

Q. No, I --

A. -- it was not my intention.

MR. STERN: He was going to strike the part about me not being a premier expert when it comes to lead.

THE WITNESS: Please, please --

MR. STERN: He agrees that I'm -- he agrees that I'm brilliant. He just doesn't agree that I'm not the premier expert when it comes to lead. Go ahead. I digress.

BY MR. ROGERS:

Q. Yeah, incorrect. But, in any event, we'll move on.

I didn't -- Doctor, listen, Doctor, you didn't -- there was nothing flippant about it. I was just kind of making a wisecrack myself. So, no worries. We'll just move on. You weren't being flippant at all.

A. I'm very respectful of this process. I'm very humbled to be on it. And I'm doing the best I can. And I'm sorry if I make any jokes, because it's not a joking matter, as you know.

Q. Yeah, no. You know, we've -- the people

participating here and on other depositions and things, listen, we all recognize how serious it is. We take things very seriously.

A. I know you do.

Q. You know, sometimes -- sometimes things get a little heated. We don't intend to have it that way. But, you know, we all -- we all take it very seriously. So, you got to try to lighten things up once in a while. But we recognize that.

A. I hear you. I hear you and I appreciate the manner in which you've conducted the deposition.

Q. Thanks. Likewise, Doctor. So far so good.

So, in terms -- this is just to confirm. I think you've already said this.

But you have not conducted a physical or a neurological or any type of medical examination of the four bellwether Plaintiffs, right?

A. No.

Q. And you have not -- see, when I said "right" and you said "no." So, sometimes just for the record.

A. Sorry.

Q. I was --
A. I have not conducted a physical exam of these patients.
Q. And you haven't performed any neurological or neuropsychological testing on any of the Plaintiffs, correct?
A. No, I have not.
Q. And you have not ordered or you have not requested that the Plaintiffs undergo any blood lead testing or any other types of medical testing as part of your work on the case, correct?
A. No.
Q. I am correct?
A. Yes. I'm sorry. You are correct. Sorry.
Q. Okay. Just want to spend a little bit of time on the -- some basic facts and your understanding of some basic facts about the case and some of the important things that relate to your testimony.
What is your understanding as to when the City of Flint switched from Detroit water as its water supply to the Flint River?
A. April of 2014 is my understanding. I

know there was a motion to do that before, but I believe the actual switch was in April 2014.

Q. And, so, we had discussed this earlier, but it's your -- is it correct that it's your understanding that the water supply was switched back to Detroit water sometime at the end of October 2015 or the beginning of November 2015, correct?

A. That's what we discussed earlier and that is correct.

Q. So, the entire time frame that the Flint River was the source of the water supply for the City was approximately 18 months, right?

A. Okay. If you've done the math, I'll accept that.

Q. Thank you. You've mentioned the FAST program or the FAST Start program several times and you've referred to it in your report. What is your understanding of what that is or was?

A. It was a program set up to replace water pipes that needed replacement based on elevated lead levels within the water in them.

Q. Do you have an understanding that if a particular residence was selected to be part of the

program that there would be an excavation and actually inspection of the service lines to determine what their composition was?

A. Yes, and I discuss some of that in my reports, as I'm sure you know, where parents reported that their lines were dug up.

Q. Right. Did you review the data from the FAST Start program as part of your work for the four bellwethers to determine what the composition was of the lead service lines that actually supplied water to their residences?

A. Well, it's not important to me because I think the water service lines don't begin at the homes. They begin at the source of the water treatment plant or lack of treatment plant. The water is flowing throughout all the pipes in the city.

And what I do know is that the FAST program decided that there was 100 percent error in their initial measurements and needed -- they needed to replace 29,000 pipes instead of 14,000 something pipes.

MR. STERN: Ms. Marut, I was on mute. I just attempted to object to the foundation.

Objection based on foundation for that last question. I apologize.

BY MR. ROGERS:

Q. Doctor, what is your understanding, if you have any, about what the composition of the pipes are that supply water, that did supply water during that 18-month period that we have described earlier from the water treatment plant to the service lines of the individual homes?

A. Well --

MR. STERN: Objection.

(Clarification requested by the reporter.)

BY THE WITNESS:

A. I'm sorry. Is there an objection?

THE REPORTER: I'm sorry.

MR. STERN: Objection; foundation.

BY MR. ROGERS:

Q. So -- yeah. So, Doctor, this is a good period of time where it's important if you can remember that leave a little pause in between the end of my question and when you begin speaking because there may be some objections. Hopefully a minimal amount. But, you know, it just is hard if

you or Corey or I are both talking at the same time. Okay.

So, my question was, I think, what is your understanding of the composition of the pipes that carried water from the treatment plant to the lead -- sorry -- to the service lines, and I'll restrict it now to the four bellwethers' homes.

A. I don't know the specific composition of the service lines that entered the four bellwethers' homes. I know that there was -- there was elevation across the City of Flint and that the measurement that indicated that only 14,000 pipes needed to be replaced was 100 percent in error. So, I feel like I want to disregard that completely.

And the reason -- another reason that I feel I can disregard it is that there was a 400% increase in the percentage of children who needed special education a few years later and also Mona Hanna-Attisha's measurement that umbilical cord bloods were 700% more likely to be elevated in Flint versus Detroit.

As you well know, Detroit is a depressed area. The people live in poverty, and it's not

dissimilar from Flint. It's just much larger. So, it's a great comparison group.

Q. I think you might have misunderstood my question, Doctor. I'm -- to be clear, I'm not referring to the service lines of the four bellwethers. Different question.

My question was, do you know what the composition of the pipes that carried the water from the water treatment plant to the service lines for the four bellwether houses, residences?

MR. STERN: Object to form and foundation.

BY THE WITNESS:

A. I know that the pipes in general consist of lead or galvanized steel with -- or copper with solder, et cetera. But I don't have specific information on those four children's service lines.

I know that -- I believe it was one of the children had positive tests for lead in the water. I forget if it was APPI TPPI or not. But it was one of them.

BY MR. ROGERS:

Q. I think we are having an inability to communicate here or whatever that expression is. I want to try to focus you on this and just ask you a

simple question.

I am not referring to the lead service lines that lead from the main pipes into the residences. Okay?

A. Okay.

Q. What I'm referring to is the pipes that carried the water from the service -- from the water treatment plant to the point at which they go into service lines into the individual bellwethers' homes, residences. Do you know what those pipes are made of?

A. No. And we're talking about multiple pipes. So, I don't know.

Q. I get you. And next question or next series of questions, I'm now referring to the service lines that go from the pipes, the main pipes, into the residences of the bellwethers' homes.

Do you know based on any research or investigation or source what those service lines were comprised of?

A. No.

Q. Did you do any investigation or do you have any information about what the plumbing in the

four bellwethers' residences are or were in terms of the composition of those pipes?

A. No. And I'm not an expert in plumbing or pipes, just to be clear.

Q. Do you know the age of the houses of the bellwether Plaintiffs where they lived during that 18-month or so period of time?

A. I believe some of houses were in the 19 -- built in the 1950s through 1970s. I did that investigation. I don't have it in front of me. But I did look at that.

Q. I think you did, if I remember correctly, ask the parents about it. But I'm not sure.

Did you do some investigation as to the age of the houses independent of just asking the parents?

A. Yes. The graduate student that I hired looked at that issue. She was able to look at the block-by-block average age of houses when they were built, and I know some of them were in the '50s, some in the '70s.

Q. I can't recall. Was that recorded in a document or on a memorandum or anything? Because I

don't remember seeing that.

A. I don't -- I don't know. I don't think so. There may be a single page that she sent me that I didn't forward to you.

Q. I'd like to see that, if you can send that to Mr. Stern and then he hopefully can send it to me at some point.

THE WITNESS: Corey, would you mind taking note of what I need to produce?

MR. STERN: I am taking notes. I'm sure Mr. Rogers will follow up with us with some a letter of some kind, but I am taking notes.

THE WITNESS: Thank you.

BY MR. ROGERS:

Q. You had mentioned earlier that some of the sources of lead that were important in your work in diagnosing and treating children who potentially were lead poisoned or had lead intoxication involved lead in the soil, right?

A. Yes.

Q. Is it -- what is your understanding of the extent to which leaded gasoline that was in use in the United States up until the point in time when it was banned contributed to lead being in the

environment?

A. Well, it was an important source of lead, and it resulted in contamination especially close to highways or busy streets. And there's a decreasing risk factor. I forget the beta weight, the regression factor, the description of the correlation.

But there is well-known logistic regressions that show that the further away you are from a major street, intersection or highway especially, the lower the lead level in the soil.

Q. And one of the other major sources of lead, potential lead exposure for children involved lead paint or lead dust in the homes, right?

A. Yes.

Q. Was that true in Flint as well as your work in Boston and elsewhere?

A. Well, it is true in general. The American Academy of Pediatrics says that they -- their estimate is that 40% of the housing stock has lead paint in it.

That doesn't mean that it's all at risk, because most of it, as I understand it in my experience, is encapsulated or intact or has been

repainted.

As long as the lead paint is not chipping, peeling and emitting dust or is encapsulated, it's not toxic to the child.

Q. Have you been provided with any data concerning the lead content of dust, paint and/or soil in any of these four bellwethers' residences?

A. No.

Q. You referred in your reports to the work that was done by Marc Edwards from Virginia Tech concerning water sampling, and the reason I'm asking you about it now is that you said you had some suspicions about I guess the accuracy of the water testing based on some recent developments in Mona Hanna-Attisha's work.

Do you have any suspicions about the accuracy of any of the water lead testing or work that Dr. Edwards did?

A. Well, Dr. Edwards himself mentioned that he did unselected sampling and did not go into the highest risk neighborhoods preferentially. So, had he done so, he would have discovered higher lead levels than what he did discover.

And ultimately -- and then my next

concern about the water testing is that it resulted in an estimation of 14,000 homes needing to be replaced when 100 percent more homes needed to have lines replaced.

And then also the canary in the coal mine argument that there's a 400% increase in the number of children or the percentage of children that need special education in Flint subsequent to the exposure and also the 700% increase in umbilical cord blood abnormalities in children in Flint versus Detroit.

So, I have evidence of 100 percent error initially with the number of pipes needed to be replaced. I have a 700% error in umbilical cord data. And I have a 400% error in special education, 400% increase in the need for special education.

This implies to me that there is a systematic, generalized elevation of lead in the water that may have been missed by Dr. Edwards, and he himself mentioned that he didn't get to test the highest risk areas.

So, that's how the case hangs together for me.

The overarching issue is there were children in Flint. Their lead levels had been coming down from 2011 into 2014 for sure. All of a sudden the water was changed. There was a spike in the lead levels in the water. The percentage of children with elevated lead levels more than doubled. And then we had the subsequent outcomes that I just described.

So, that's the north star, if you will. That's the basis of the thesis. It hangs together from the beginning, from the incipience of the water being -- losing its organophosphate treatment through the children being damaged.

Q. You just mentioned something to the effect that you believe that there is some information in some report about the water lead content of one of the four bellwethers children's homes. And, so, my question is what is that? What is the source of that? Because I'm -- I don't recognize that.

A. Well, in my report -- I'm sorry. I have four reports here that are 14 pages each.

But I did include it in my report specifically. The mother got a home lead testing

kit and she described it turning bright red, that she was quite fearful about that, and that was the indication of having lead in the water.

She was instructed on how to do the test, she said, extensively. She knows she did it right. And lead was found in her tap water.

Q. Have you ever seen any reports of the water lead levels or content in any of the houses where the bellwether Plaintiffs lived?

A. No.

Q. When you had that conversation with that Plaintiff, and it is in one of your reports and we'll --

A. It is.

Q. -- get to that in a bit. Did you ask that parent if they -- if she or he still had a copy of that report or any information that was generated from that sample that was tested?

A. I don't recall if I asked her for a report. But, you know, as I understood it in our discussion, it was a qualitative test. So, the only thing she needed to understand was that it was red and red was bad.

So, there was not -- it didn't say, as

far as I understood from our discussion because I asked her if it was quantitative -- I asked her if it showed numbers. Please excuse me. I didn't ask her if it was quantitative. And she said no. She just knew it was red.

Q. Have you read -- I don't think you have, but just to confirm.

You did not read Dr. Marc Edwards' depositions that he provided in the case, is that right?

A. No.

Q. So I'm right that you did not?

A. Please excuse me for my answering incorrectly to your question.

I did not read them.

Q. I'll try to ask the question differently so we don't fall into that, but just we need to keep the record clear. That's all.

A. I'll endeavor to do that. I understand the issue.

Q. Yeah, as do I.

The -- Dr. Edwards has written some papers recently, two in particular, about Flint concerning his work evaluating biosolids.

Have you read either of those two scientific papers that Dr. Edwards wrote?

A. No. I saw reference to them, but I didn't read them.

MR. ROGERS: Okay. Going to get into -- let's see what time it is. It's 11:30. Why don't we take a five-minute break.

Here's what I would suggest, if it's okay with everybody. Why don't we go till, say, 12:30, and then we can take a half-hour lunch break at that time.

So, let's take a five-minute break now, 12:30, half-hour lunch break, and then we can continue on. Doctor, we'll do whatever you think is best.

THE WITNESS: That's fine. 12:30 is great.

BY THE WITNESS:

A. I realized that I left out something when you were asking me about my clinical experience with lead poisoning.

BY MR. ROGERS:

Q. Sure. Go ahead.

A. Doing pro bono work with the NAACP developing a clinical program in Indianapolis where

there is lead in the water, and we're going to make that a national model. But it is all pro bono, so...

But it's lead-related and you had asked me about my lead work, and I am working fairly intensively on it. And I skipped it. So, please excuse me.

And I certainly agree with returning at 12:30.

THE VIDEOGRAPHER: The time --

MR. ROGERS: Go ahead, Robert. Yeah, we can go off the record.

THE VIDEOGRAPHER: The time is 11:35 a.m., and we're off the record.

(WHEREUPON, a recess was had from 11:35 to 11:44 a.m.)

THE VIDEOGRAPHER: The time is 11:44 a.m., and we're on the record.

BY MR. ROGERS:

Q. Doctor, I'm going to ask you some questions about some information specific to each of the four bellwether Plaintiffs, and it's good that you have the reports handy so that you can refer to them although, as we all know, I did mark

them as exhibits earlier and we can refer to them if need be.

But in particular I'm going to ask you questions about blood lead levels and other information. So, if you want to start and pull out if you have handy the SPPI report, we'll go in alphabetical report.

A. All right. I have it out. I have it.

Q. Good. So, this is Exhibit 9 (sic).

For EPPI SPPI, the only blood lead level test information that you're aware of is that a blood lead level test was reported on February 16, 2016 that was reported at less than 3.3 micrograms per deciliter, correct?

A. Yes.

Q. Are you aware of any other blood lead level testing that was done at any point in time on EPPI SPPI?

A. No.

Q. Do you know what the average or mean for blood lead levels were for children of his age nationally as of the time that this test was done in 2016 or thereabouts?

A. Well, you know, you refer to average.

Typically it's calculated as geometric mean. Are you familiar with that?

Q. Go ahead.

A. Geometric mean is a measure of central tendency, but it's not an average where you add up a lot of lead levels and divide by the number of measurements you have.

Geometric mean levels are how they're reported. What they do with that is they take each number and multiply it by the next number, by the next number, et cetera, and take the root of that. So, the root could be 1,000, a thousandth root as opposed to the square root, et cetera. And you generate a geometric mean, which people call average. But I just want to be clear that it's not an average.

The lead level in 2016 for females was 0.67. I'm sorry. It's 0.765 the last time I saw it. And for males it was about 0.89. For African-American children, it might have been a little higher than that.

So, that's -- that's where we are.

Q. Let me show you the -- while we're at it.

MR. ROGERS: And, Corey Marut, I'm going to jump ahead here to an exhibit, which is Exhibit 18, that we'll get to. But we'll mark it now and I will fill in the exhibits from 8 through 18.

BY MR. ROGERS:

Q. But I'm going to just show you this, Doctor, and ask you -- that's not the right one. Sorry. That's not the right one either.

Well, we'll come back to it, Doctor. I can't put my hands on that right at the moment.

But are you familiar with the -- what is the source of the geometric mean blood lead level measurements that you just described? Is that from the NIH/CDC report based on the NHANES data?

A. Do you mind? I have it right beside me. I forget. I have the paper right here.

Q. Great, thanks.

A. Because I have several reports. I have morbidity and mortality weekly is the levels through 2010 where the geometric means are similar to what I just described.

But then in from the CDC, December 30, 2016, there is an average -- geometric -- an average blood level of 1.0 around the

United States.

And then from the EPA in 2016, ages 1 through 5, the overall geometric mean is 0.758. I quoted it as 0.76. It's 0.758. So, the EPA.

They're slightly different numbers.

And then I have breakdowns of every state, which is a fairly extensive document that I spent time. Can you see that? Maybe not. But there are dozens and dozens of points that the CDC provides on their website.

Q. Yeah. Let --

A. I need to use -- I just use what I just described.

Q. Yeah. Let me -- would you hold that up and just show me the -- is there a title page or anything like that that you could show me?

A. Sure. I'll read it to you. "Blood lead levels in micrograms per deciliter among U.S. children 72 months of age by state, year and blood lead level group," and it's got over a dozen subpoints based on populations of different areas for different states. So, it's literally hundreds of measurements by different areas by state.

But the overarching theme is that the

numbers that I gave you are salient.

Also, you know, typically in the labs that I've run, and you know I've run a lab in Springfield, Mass that did more than a million tests per annum at University Health System in Springfield, Massachusetts and I directed that lab.

And when we reported lead level greater -- less than 3.3, doesn't mean it's zero. Typically it means that it's less than 3.3 but that it's extant, that it exists.

And that's part of the concern that I have with -- that melds with the half-lives of lead being less than 10 days with -- those lead levels can disappear rather rapidly as we were discussing with the one-compartment, two-compartment, three-compartment mode and the first phase two -- two-phase three-compartment -- three phasic modes that gets into a complex multifactorial analysis of how lead goes away from the body. But we discussed all that.

Q. Right. So, with respect to the EPPI SPPI blood lead level that was reported on February 16, 2016 as less than 3.3 micrograms per deciliter, doesn't that mean that for that

particular lab that the level of detection for blood lead was less than 3.3?

A. No, not necessarily. Now, these CLIA labs have different approaches and they're all acceptable. CLIA is Certified Licensed High Level Analysis Lab. I forget what the "I" is in CLIA even though I ran CLIA labs.

It can mean that it's not detectable because zero is less than 3.3, as obviously you're hinting at. I am not being flip once again. But it could be that there is zero, but it could be that it's 2.5 or 3.1. I don't know.

Q. Yeah. So, let's take a look at this, I'll share my screen, and we'll mark this as the next exhibit, which will be No. 9.

(WHEREUPON, Bithoney Deposition Exhibit No. 9 was marked for identification: 2/16/16 blood lead level testing report; Restricted Distribution-Confidential-ESPPI GeneseeCHD-MD-540099-000001.)

BY MR. ROGERS:

Q. And this is the blood lead level test that I'm referring to here for EPPI SPPI

And you see here it says -- the highlighted section. Could you see my screen okay, the document?

A. I can. I can.

Q. "Lead, Blood (Pediatric) - WIC, low. Lead, Blood (Pediatric), less than 3.3 micrograms per deciliter."

And it says here that it's a capillary blood draw, the section that I am moving my cursor across.

So, do you have any further information about this particular laboratory at which this blood lead level, this blood sample was tested from a capillary blood draw as to what their -- what they meant when they said less than 3.3?

A. I do not know what they mean exactly. I can tell you that there are error rates around the capillary blood draw that are typically between 1 and positive 1 -- 1 microgram on other side, because what can happen is if the child's finger is not cleaned appropriately, lead could be on the finger and therefore the lead level could be reported as higher than the actual lead level.

However, also, if the lab technician

squeezes the finger that she's pricked too hard, there's an emanation of serous fluid, yellow watery fluid, that comes out and dilutes the lead level.

So, it could be that it's a little bit higher or lower. So, depending on the certification of this lab, that number can be either quite accurate, and as the Academy of Pediatrics says, it can be used as a screen, or it can be off more than 1 microgram on other side.

I have no information about that. I'm just discussing this in general.

Q. How would you determine with respect to a particular laboratory what their certification level was in terms of accuracy of results?

A. Well, you'd look to be sure they're CLIA certified, which is a national certification program. And then you want to be sure that their technicians are trained in the extraction of blood lead by the capillary method. And there are books on this.

But typically there's a one-page mandate or article that talks about how to do it, how to clean the fingers, how not to squeeze too hard but squeeze appropriately, what kind of lancet to use,

the depth of penetration of the lancet, the preparation of the blood, you know, having anticoagulants in it.

There's a lot of points, like 12, 15 things that the technician has to do right. And most of them do it right.

Q. Okay. I'm going to jump ahead to what I was trying to find earlier, and that is Exhibit 12, which I'm going to show you on the screen and ask you about this with respect to geometric mean blood lead levels that we were describing earlier.

(WHEREUPON, Bithoney Deposition Exhibit No. 12 was marked for identification: CDC Fourth National Report on Human Exposure to Environmental Chemicals, Updated Tables, January 2019, Volume One.)

BY MR. ROGERS:

Q. So, this is Exhibit 12, the Fourth National Report on Human Exposure to Environmental Chemicals, Updated Tables from January 2019, Volume One. And it's a massive document. So, I've not included the whole thing here. It's from the CDC Department of Health and Human Services and the

NHANES data. And you can see NHANES here, National Health and Nutrition Examination Survey.

Did you take a look at these -- at this data for determining what geometric mean blood lead levels were?

A. Well, I alluded to this table earlier when I said it was through 2010, but this data to me is irrelevant through 2010 because we are looking now at data in 2016 and -- I'm not sure -- maybe 2019, but I think it's only through 2016. The lead levels have been going down systematically since 2010. So --

Q. Yeah, so --

A. Even the 2011, 20 whatever. Anyway. I'll stop. Please excuse me.

Q. That's okay. Because this is the page I'm referring you to now, the 4 of 4 for this exhibit anyway.

And this shows what you were describing earlier, the geometric mean for children ages 1 through 5 from 2013 to 2014 to be .782 and then for ages 1 through 5, 2015 to 2016 being .758.

So, those generally are in the same range as the geometric mean blood lead levels from

the sources that you described to me earlier, right?

A. I'm sorry. You dropped out. You're saying these are similar to the sources I mentioned?

Q. No. The results are similar, meaning the results that you reported to me from different data sources are essentially comparable to or in the same range as these that are reported here in this document, right?

A. Yes. And I did report the CDC data. I did report the mortality and mortality weekly -- morbidity and mortality weekly report and the EPA data. But they're all quite similar.

Q. Okay. Thanks. So, you would consider the CDC data based on the NHANES examination survey to be a scientifically valid and reliable report of the results, right?

A. Typically the CDC is well respected. I haven't looked at the methodology that they -- that they performed, but typically the CDC is a respected agency.

Q. But with respect to the data that you describe to me, that data is scientifically

reliable and valid based upon you having cited it to me earlier in the deposition, right?

A. Well, the reason I believe that all of the data, including what you're showing me, is probably scientifically valid is because there's consistency.

Q. Okay. Thank you. Fair enough.

All right. We'll stop sharing my screen for the moment, and I'm going to ask you some more questions about EPPI SPPI sort of background information.

The bone scan testing that was done by Dr. Specht, and for EPPI SPPI it was done on August 24, 2019, the result that was reported is 6.72 micrograms per gram.

Do you have any information or data about what the geometric mean or the average or any other reported levels for children in that age group were for bone lead scans?

A. The Canadian study of tibial bone done in Toronto, which is a city with an inner city, I don't -- I can't say I know the demographics exactly of Toronto and I didn't look them up, but that tibial bone lead level was less than

1 microgram per gram of bone. I think it was something like 0.6 micrograms. .6.

Q. What was --

A. It's below 1 microgram.

Q. So you're referring -- sorry.

(Clarification requested by the reporter.)

BY THE WITNESS:

A. Do you want the exact number from the Canadian study?

BY MR. ROGERS:

Q. Yeah, what I was saying --

MR. ROGERS: And, Corey Marut, my bad, I started talking before the doctor was done.

BY MR. ROGERS:

Q. But I was about to say that's the McNeill study, right?

A. McNeill, yes. And the average tibial lead level in children, I had to interpolate it, but is 0.5 micrograms per gram of bone mineral.

Q. Right. So, that testing was done using a KXRF device, right?

A. I believe so. But I'm not sure if it was a P, a portable one, or not. I know that Aaron

Specht uses the P version. That's portable.

Q. Apart -- okay. So, apart from that study, do you have any other reported data or literature for bone lead scans?

A. Hold on one second, please.

The Nie study, I think this is -- the Nie study that I mentioned that came out of my old program at Harvard -- well, no, I'm sorry. I'm quoting the .7.

I think that's it. There isn't a lot of tibial bone data. I have a half-life of lead in the bone as less than two years, but I'm not seeing another population-based study.

Q. Yeah. That's what I -- that's a good way to describe it.

Are you aware of any other control groups or population-based studies that report on the lead content of bones in children using bone scanning techniques?

A. Not aware of any population-based studies other than this one that would be comparable --

Q. Okay.

A. -- to these children in Flint.

Q. So --
A. Toronto was as close as I could get, if that makes sense. There are no U.S. studies that I could find. And Toronto is a city. It's got old housing, et cetera. But it's clearly different.
Q. Right. So, with respect to E[redacted] S[redacted], you don't have any information and you're not aware of any reports concerning what the lead content was of the water in his residences at any point in time, is that right?
A. No, I do not have that data.
Q. And, similarly, with respect to the composition of the service line through which the water was flowing to get into the S[redacted] residences, do you have any information about what that was comprised of?
A. No.
Q. Is that important to you in any of the opinions or your evaluation that you have done, namely, whether or not the service line leading into the residences that E[redacted] S[redacted] lived in was lead or something else?
A. Wasn't important to me as I formed my opinion.

Q. Why?

A. Because I mentioned to you that there's 100 percent error rate as far as what the FAST program determined needed to be corrected. So, that indicates that the problem was at least 100 percent worse than we thought it would be, than what they thought it was when they first did the testing.

And the fact that there is systematic destruction of children in terms of their intellectual functioning so that 80% of children require special education means that there's a systemic problem.

The fact that the perinatal blood umbilical cord levels were 700% worse than in Detroit also means, to my estimation, that there is a systematic problem with lead levels in Flint in all areas, because --

Q. So, Doctor.

A. Go ahead. Sorry.

Q. No. I want -- go ahead and finish. I didn't mean to interrupt you. I thought you were done.

A. Go ahead.

Q. So, with respect to the FAST Start program, the 100 percent error level that you're referring to, that is not an error level with respect to making determinations as to what actual -- the composition of pipes that were dug up out of the ground for the inspections that were done, right?

A. All I could read was that upon review of the FAST program, the number had to double from 15,000 to 29,100, and those pipes required pipe replacement and this was based on their measurements of lead in the water and the pipe type, et cetera. So, I don't have --

Q. Right, but that --

A. Please go ahead.

Q. But that relates to the estimates as to the number of homes that would be inspected for making decisions about replacement of pipes. It does not relate to errors or increases in the percentages of actual findings when the pipes were excavated, right?

A. That's not right in my opinion. It says these are the pipes that needed replacement.

Now, I took that to mean, and you can of

course teach -- educate me if I'm wrong.

I took the fact that they needed to replace pipes and at a cost of approaching a billion dollars or more, I took that to mean that the water -- that the pipes were dangerous and that the water was problematic.

So, what I read was that the pipes required replacement. It wasn't -- it wasn't that they were simply measured, as I believe you said, but that the pipes were deemed to require replacement.

And that is not undertaken lightly when there is a billion 3 in money that needs to be spent. That's a lot of money on pipe replacement. So, I don't think they undertake it lightly.

I did not look at the blood -- pardon me -- the water lead levels. I trusted the FAST program would not replace pipes unless they required it.

Q. Right. Would you please hold up the document that you were just looking at and that you're referring to so that I know what it is you're talking about.

A. This is just page 4 of my report on EPPI

SPPI [redacted]. Page 4.

Q. Yeah. No. Okay. I saw that in the report on page 4. But what is the FAST Start data document that you're referring to on which that statement in the report is based?

A. Well, I gave the citation, and I'll give it to you again, but it is -- the citation is listed immediately below that paragraph on page 4 toward the bottom, and it's from https -- you have it -- forward slash twice https://protect-us.mimecast.com/s/ZeOeCzplkyTM81Xi4olmb?domain=mlive.com.news 2016, updated 1/19/19.

So, this was originally reported as the low level in 2016 and then in January 19 of 2019 it was updated to require that -- to state that there needed to be a replacement of over 29,000 pipes.

I have the citation in my -- it should be live if you have a Word document. I don't know if you have -- a Word document was shared with you. But the citation is quite clear.

Q. Right, but the citation is to a media report, MLive, right? It's not to the actual FAST Start report, is it?

A. It is, as you say, it's a media report.

Q. Okay. So, with respect to the issue of

what the composition of the service line was at the residence where EPPI SPPI lived in terms of whether that service line was made of lead or something else, you don't know what that information is, right?

A. That's correct.

Q. The issue of when EPPI SPPI and his family stopped drinking water after the water switch, the information is, based on your interview of the parents and the deposition testimony, that they stopped drinking the water during the summer of 2014 or late 2014. Correct?

A. If that's what's in my report, I'm sure it's correct. It's derived from --

Q. Let's --

A. I derived it from my parental interview.

Q. Well, let's make sure that it is, and I can direct your attention to it. And that is on page 3, if you have your report with you, the third paragraph. I'm sorry. The second paragraph.

Do you have that handy?

A. I do.

Q. Let me pull that up so we can see it just to make sure.

MR. ERICKSON: And that's Exhibit 5?

MR. ROGERS: It is. This is Exhibit 5, Phil, yep.

BY MR. ROGERS:

Q. So, let me share the screen. Doctor, I don't -- you could do whatever you want obviously. If you want to refer to your document that you have a paper or the screen is fine.

This is the paragraph that I'm referring to.

"Ms. Wheeler reported that she and her family all drank tap water continuously until sometime late in 2014 or possibly 2015. She states that for at least several months after April 25, 2014" -- and remember, Doctor, we talked about that, that's the date of the water switchover to the Flint River, right?

A. Yes, sir.

Q. "Each day she and her children drank approximately four glasses of tap water derived from the Flint River."

Then she says in the report of the interview, your interview of her, "After 4/25/14 the mother noticed that the water had become

discolored to a dirty gray. She reported that the water in her home was malodorous and smelled like rotten eggs and chemicals."

Right? Is that what she reported to you?

A. Yes, sir.

Q. And then she says in the paragraph a little bit further on -- now, I didn't highlight it. Let me just highlight it here to be complete.

I have highlighted the next sentence there.

You report, "A few months later," that is, a few months after 4/25/14. Is that what you meant by saying "a few months later" in reporting what she told you?

A. Specifically she states that for at least several months after 4/25, each day -- each day she and her children drank four glasses of tap water.

Q. Yeah, but what I'm referring to, Doctor, here is this sentence.

You say, "After 4" -- maybe you look at the screen, you can see my cursor.

"After 4/25/14 the mother noticed the

water had become discolored to a dirty gray. She reported that the water in the home was malodorous and smelled like rotten eggs or chemicals."

The next sentence begins with "A few months later."

Does the -- do the words "A few months later" mean a few months after April 2014 when she noticed that the water was discolored and it smelled like rotten eggs?

A. You know, you're making a fine point, and I believe what you're saying is correct but --

Q. Okay.

A. -- it's been months and it may -- it may refer to a period of time later than that.

MR. STERN: Doctor -- I objected to form and foundation. And, Dr. Bithoney, don't guess.

BY MR. ROGERS:

Q. Then you say --

A. I'm not sure.

Q. Then you say, "A few months later," continuing on, "A few months later when she learned about the Pb," lead, "contamination of the water, she stopped using the Flint water for drinking but continued to bathe and wash dishes in it."

Correct?

A. That's what I wrote, yes, sir.

Q. So, are you saying that you don't know if the "a few months later" refers to the previous sentence where you said "April 25, 2014"?

A. I don't want to guess. I'm a little -- little -- I'm not sure. I'm not sure.

Q. Did you review her sworn deposition testimony on the subject matter of when the family stopped drinking the water?

A. I did review it.

Q. And what did she say there?

A. I'm not sure as I sit here. As I mentioned, I went through thousands of pages. But I'm sure you have it.

Q. Okay. Let --

A. I also would like to point out that in the next paragraph the mother reported that the tests of the water in her home turned bright red. I see you've highlighted it. That's the case that I was referring to earlier.

Q. Thank you. Yeah. That refers to some -- I guess the testing that was done in her home, and that's the one where we discussed that

you haven't seen an actual report for what the lead content was. But this is the reference to what you described earlier, right?

A. Correct.

Q. Okay. I'd like to continue on and just finish up. We have 15 minutes or so before we're going to take our lunch break, and I want to ask you some specific questions about information concerning the TPPI Plaintiff, APPI TPPI

So, if you want, if you have that document handy, that report, if you want to refer to it, that might be helpful.

A. Give me one second.

Q. Sure.

A. I have the report.

Q. With respect to the blood lead level test report for her, APPI TPPI there was a blood lead level test that was reported on January 12, 2016, and is reported at less than 3.3 micrograms per deciliter. Correct?

A. Yes. If it's in my report, that is the case. I won't fumble around to find it.

Q. Let me show it to you just to make sure.

If you'd look at page -- page 2 of your

report for TPPI is blank for some reason, so there is a blank page there, at least the one I got.

But this is reported at -- on your report at page 4, the third from the last paragraph. Do you see that, "On 1/12/16"?

A. I do. I want to assure you that in my own Word document page 2 is blank also. I somehow inadvertently inserted a blank page and that's due to my own lack of sophistication. But there is nothing that I've omitted or attempted to hide from you by having that blank page.

Q. I wasn't -- yeah, I wasn't implying that there was, but yeah.

A. I know you weren't, but for the record I just want to make sure that it's stated that it's just an inadvertent typing error. And thank you --

Q. Sure.

A. Thank you for your support on that matter.

Q. Sure. I was going to say, is that where you reported all the things to Corey confidentially that then you just took out of that report or what. Just kidding.

Okay. So, no, I understood it as such.

There was just a word processing situation.

But, anyway, getting back to what we are talking about now.

Let me bring up the TPPI report, which is Exhibit 6, and I'll share my screen so we both know, make sure we're talking about the same thing here.

Okay. Can you see that, Doctor, all right?

A. I can.

Q. I'll shrink it down a little.

This is on page -- see, there is the blank page 2 that we are referring to. Nothing on it.

But it does appear -- you know, it ends with, you know, you're talking about here introductory stuff. Then you go right into the family interview or your review of actually records. So, anyway.

Sorry. Bear with me.

Yeah, this one I'll -- I didn't highlight it, but I'll highlight it here. I can't get it to highlight right, but anyway you can see it.

On "1/12/16," 2016, "A[redacted] had a blood lead level drawn that was measured at" -- you reported here -- "at less than 3.4." But I'm going to show you the actual test report in a minute and it's 3.3.

But, in any event, you say, "It is not clear from the medical record if this was a venous or a capillary measure."

We'll take a look at the record.

These things that you're reporting are based on the actual test report, right?

A. Yes. I believe -- yes. I had -- I had over a thousand pages of documents that included lead levels, and it's possible that I misread the 3.4 to 3.3.

I do take notes when I'm doing this work because I need to take several thousand pages down to ten pages or so and then I assemble it into a report.

So, I may have misread my own handwriting, which I have been known to do, or I might have misread the report and thought that it said 3.4 and instead of 3.3.

Q. I'm not grading your reports as you

would for your students. Don't worry. We'll look at the report in a minute.

So, in any event, this is what I wanted to ask you about here.

"Records also seem to indicate that a Pb level was drawn on 4/19/12 but I did not find any result of that measurement."

I have not myself personally seen any other blood lead levels. But what are the records that you are referring to here that seem to indicate that another one was done on 4/19/12?

A. Somewhere in those thousands of pages there was an allusion to a lead level done on 4/19/12. I searched for it diligently. I could not find it, and so I mentioned it in case it was real and you wanted to try and find it.

I certainly after a diligent search could not find it, so I of course didn't include it. But in an attempt to be complete and to allow you the possibility of finding that test, I put it in my report. Didn't want to skip it in case it was reviewed.

Q. Do you know which records you are referring to when you say that it seemed to

indicate that there was a test on that date?

A. I don't know. I had multiple medical records, multiple school records, deposition records, hospital records. I don't know as I sit here months later.

Q. So, I'll show you, which we'll now mark as Exhibit 10, the actual TPPI blood lead level test from January 16 -- January 12, sorry, 2016.

(WHEREUPON, Bithoney Deposition Exhibit No. 10 was marked for identification: 1/12/16 blood lead level testing report; Restricted Distribution-Confidential-ATPPI-GCHD-MD-540141-000001 and 000002.)

BY MR. ROGERS:

Q. Can you see that on your screen okay?

A. I can.

Q. And it says here, "Lead, Blood (Pediatric)," here it's highlighted, "Less than 3.3," you see it's 3.3 micrograms per deciliter. But it does say here, "Capillary blood draw."

Do you stand corrected on whether it indicates that it was a capillary or a venous blood draw here?

A. Well, it's a capillary draw.

Q. Do you have any information similar to what I was asking you about earlier, that is, with respect to what the laboratory that did the blood lead test standards are with respect to reporting, that is, that the level of detection of their equipment means that at less than 3.3 the equipment is not able to detect the blood lead level?

A. I don't know about that specific lab. As I said, I've run huge laboratory testing programs. I've reviewed lab data for decades. I don't know about that specific lab. I don't know if their technicians were certified in the 12 or 15 step program that they need to do in order to have accurate capillary blood lead levels. I don't know if they are using atomic absorption spectroscopy to measure.

I'm just not sure. There are other ways of measuring and they have different kinds of error levels.

But in general, if it's a certified lab, I would have faith in the data as reported.

Q. So, again, if it's reported this way, what that means to you is that you don't know

whether the actual amount was zero or something in between zero and 3.3, right?

A. Yes.

Q. And is the error rate that you described earlier, plus or minus 1 micrograms per liter, does that also apply as far as you know to this lab test report?

A. It may.

Q. Depending on what?

A. Depending on the certification of the lab and whether they followed the techniques that we described fairly extensively earlier.

Q. Okay.

A. And I don't know if this lab chose to report levels. I mean, they could have chosen to report another level. I'm not sure. But I don't know how this lab does its work.

Q. Can you check it out? Am I sharing my screen now with you or not? No.

A. You stopped sharing it one second ago.

Q. Right, okay. Thanks. Sometimes you got to be careful when you're sharing screens or not during these depositions.

Okay. Thank you.

So, turning again back to some specifics for A[redacted] T[redacted]

With respect to the bone lead scan that was done on April 15, 2019, that was reported as 9.65 micrograms per gram. But I guess my question is the same questions that I asked you about S[redacted].

In terms of the geometric mean or the average or a population survey of bone lead measurements, you don't have any additional information with respect to those subjects different than what's reported in the McNeill study, correct?

A. Well, the Toronto study --

Q. Right.

A. -- as I said, 0.5 micrograms per gram of bone.

Q. I got you, Doctor. I'm just trying to make sure that --

A. That's all I have in terms of a population-based study. They are few and far between.

Q. So, is that also true with respect to the bone lead scans for the remaining two

bellwether Plaintiffs so I don't have to ask you about it again, that is, V[redacted] and W[redacted]

In terms of information that you have about geometric means or averages for another population study group, the McNeill study is the only information from Toronto that you have, right?

A. For the bone -- for the bone -- let me just look at my bone file just for one second. I think that's true.

McNeill, yeah, that's the only population-based study that I was able to find of bone lead levels in children of this age, and it's a half of a microgram per deciliter as the normative population-based number from micrograms per gram of bone.

Q. With respect to Ms. T[redacted], you are not aware of any water lead level testing that was done for any of the residences in which she lived, correct?

A. If I didn't report it, then I was not aware of it.

Q. With respect to the composition of the service line that went into any of the residences where Ms. T[redacted] lived, you do not know what the

composition of the service line or lines were, correct?

A. You are correct.

Q. And then I didn't ask you this about S[redacted] and I forgot. Just to make sure, and then I'll ask you about Ms. T[redacted] too.

With respect to E[redacted] S[redacted], you don't have any information about any testing that was done for any of his residences about lead content of dust, paint or soil in the environment in the yard of their residences, right?

A. If I didn't report it, then the answer is I did not have it.

Q. Same with respect to T[redacted] you don't have any information about the content of lead in dust, paint or soil for any of the houses in which she lived, right?

A. That is correct.

Q. Okay. With respect to the subject matter of when Ms. T[redacted] and her family stopped drinking water from the Flint water supply, can you take a look at page 3 of your report.

A. Yes.

Q. And I'll -- thanks. I'll pull this up.

This is -- share the screen again.

This is Exhibit 10. No. Wrong one. Sorry.

This is Exhibit 6, page 3 with the paragraph, "During the years." I'll just highlight this last paragraph here.

Again, and these are your -- your summary of what she told you during the telephone interview, right?

A. It may come from her deposition but -- no, this would come from my telephone interview because it says, "She stated."

Q. Yeah.

A. A lot of the information I got was from these voluminous depositions where I extracted what I thought was important. But when it says, "She stated," that means it came from a telephonic interview.

Q. Okay. And you say here, "In my conversation with A[redacted] mother."

So, that would indicate that, right?

A. That's correct.

Q. Thank you. You say, "In my conversation with A[redacted] mother, she stated that she does

not recall precisely when she cut back her drinking of Flint River water but stated that it was after free bottled water was made available in 2015."

Do you remember her providing any additional information to you about when the family stopped drinking the water?

A. No, that's it, because she could not be definite and I didn't press her to give me data that she didn't -- couldn't provide.

Q. Did you review her deposition testimony in an attempt to get any further information on this subject, namely, when the family stopped drinking the water?

A. I did review it in general. I had in many instances or at least in several instances, not just in this case, but in all the bellwethers, I took what the mother told me. I assumed that superseded what was in the depositions because I had direct discussions with mother.

Q. What do you mean by "superseded"?

A. Well, I don't know that there was anything in her deposition that contradicted what I have written, but in general when I have gone through this, if the deposition differed with what

the parents were telling me, I labeled it as derived from conversation and took it as what would go in the report.

Q. Okay. Let me just clarify that. Then we'll take our lunch break.

In these four reports, I did not see any comments to the effect that the interview -- the information provided in the interviews was different than the information that was in the deposition.

Is that right as far as you remember?

A. As far as I remember, I'm not aware of these four having differences between their deposition.

But in general when I've approached depositions, I've taken what I hear -- when I've approached writing a report, I have taken what the parents tell me as what should go in the report.

Q. In any of the other bellwethers' interviews that you did, did you -- do you remember noting that the interview's information was different than the -- what was in the deposition?

A. I do not recall any differences. I'm talking about a general practice that I have of

believing the parents when I do detailed interviews.

MR. ROGERS: Okay. So, it's about 12:30. Let's take a lunch break till 1:00, and then we'll press on ahead. Okay, everybody?

THE VIDEOGRAPHER: The time is 12:32 p.m., and we're off the record.

(WHEREUPON, a recess was had from 12:32 to 1:04 p.m.)

THE VIDEOGRAPHER: The time is 1:04 p.m., and we're on the record.

BY MR. ROGERS:

Q. Okay, Doctor. Turning now to the Plaintiff V[redacted]. I'm going to go through the same series of questions with respect to her.

The information about her blood lead levels and reports, there is some more information than what we have on the other Plaintiffs. There is a total of four blood lead level test reports. So, let's go through those.

And do you have V[redacted] -- the report you did on V[redacted] handy?

A. I do. I do. And, Attorney Rogers, can you tell me what page it's on, please.

Q. Yep. The -- your report of the blood lead levels appears on page 4.

A. Thank you.

Q. So, the first -- and I'll show you the reports in a minute.

The first report is of a test that was reported on November 3, 2014, and it's less than 3.3 micrograms per deciliter, right?

A. Did you say November 3, 2014?

Q. Yes.

A. Yes, I see it now.

Q. And then the next one is on September 25 (sic), 2015, .7 micrograms per deciliter, right?

A. Yes. And you see this calls into -- addresses that point where a lot of labs, you know, don't bother to report a level like that and there is a variation in reporting. It's hard to know what the standards are in different labs from a distance without understanding their protocols. We were talking about reporting levels less than 3.3 or 3.4 earlier.

Q. Next blood lead level report was from January 14, 2016, and it's 1.3 micrograms per deciliter, right?

A. Yes, sir.

Q. And the next one, final one, was May 22 (sic), 2017 where the report was .5 micrograms per deciliter, right?

A. Yes.

Q. And I'll bring these reports up now so that you can see them.

This will be Exhibit 11.

(WHEREUPON, Bithoney Deposition Exhibit No. 11 was marked for identification: VaPPI 11/3/14 blood lead level testing report; no Bates numbers indicated.)

BY MR. ROGERS:

Q. This is the first one on RPPI VPPI and it's as we discussed, there you can see it highlighted, Doctor, less than 3.3 micrograms per deciliter, right?

A. Yes. Does it say if it's capillary? I don't see that. I don't remember.

Q. That was going to be my next question to you. I don't see it either.

Can you tell from this report whether

it's capillary or venous?

A. Well, I'll give it a shot. Can you go down a little bit.

Q. Yep.

A. And some more.

I was hoping to be able to tell based on the hemocue, hemoccult, and all that. But the hemocue could be a capillary measure also, a measure of anemia. Okay.

So, I don't know. I don't know what it is. I was hoping if we scrolled down, another test that's required to be done, venous --

Q. Yeah.

A. -- reported. I don't know the answer.

Q. Thank you. While we're at it, the hemocue is listed as 12.1. Is that significant in any way with respect to the blood lead content or?

A. Can you tell me how old the child is at that point? I'm sorry. I should be able to do it also.

Q. Well, let's see. So, the collection date was November 3 of 'PPI and she was born on PPI . So, she would have been a year and a couple weeks.

A. Then no. There's a so-called physiologic nadir where at one year of age children's hemoglobins and hematocrits reach the lowest level without being abnormal and then the hemoglobin level and hematocrit level build up.

So, given that she was at approximately the age of a 1-year-old physiologic nadir, this is not an abnormal hemocue.

Q. Does the fact that she was 1-year-old give you any -- is it suggestive of whether the blood test was via a finger prick or capillary versus venous?

A. No. No, I don't know if -- I don't know if it was a screening test or if it was ordered because of some concern or whatever, which might change the way the doctors ordered it. But since it's not labeled, I just don't know.

Q. Same question with respect to the way that this particular laboratory reports its results in terms of the less than 3 micrograms per deciliter. You don't have any additional information about that, right?

A. No, I don't know how they report at all.

MR. ROGERS: Next exhibit will be -- so, it

looks like I got my numbers mixed up here. Shoot.

So, previously I had indicated that the CDC/NHANES data on blood levels was Exhibit 12, and it looks like I have the next one as 12.

So, I'll tell you what. Give me -- sorry about that. I want to re-mark these so that I don't mess up on the numbering. Let's go off the record for a couple minutes, and I'll just get these renumbered so I don't screw up on the numbering.

So, off the record for 2 minutes.

THE VIDEOGRAPHER: The time is 1:10 p.m., and we're off the record.

(WHEREUPON, a recess was had from 1:10 to 1:11 p.m.)

THE VIDEOGRAPHER: The time is 1:11 p.m., and we're on the record.

BY MR. ROGERS:

Q. Okay. Sorry about that.

So, going to the next exhibit, which would be Exhibit 13. Can you see that all right, Doctor?

A. Yes, sir.

(WHEREUPON, Bithoney Deposition

Exhibit No. 13 was marked for identification: 9/2/15 blood lead level testing report; Restricted Distribution-Confidential-RVPPI[redacted]-MCHC-MD-540069-000026.)

BY MR. ROGERS:

Q. This one is a blood lead level test report from, let's see, September 2, 2015. Lead blood highlighted there, and the measurement is point -- 0.7 micrograms per deciliter that's listed there. And over on the right a little bit it says here, "Reference range, 0 to 5."

Do you know what that means?

A. It's the range in which they don't report it out as abnormal.

Q. And you can see down here it says, for some further information, and it goes along the lines of something that you and I talked about earlier.

It says, "Blood Lead Comment: Less than 5 micrograms per deciliter, Not lead poisoned," and then it has another one, "5 to 9.9, Rescreen within 6 months."

Is that --

A. That's --

Q. Go ahead.

A. That's a laboratory decision to list it that way, you know. I would not list it that way, as "Not lead poisoned." I would -- well, 0.7, 1.3, all those things, I wouldn't list it as "Not lead poisoned." There is evidence of toxicity at 1.0.

You know, I'm in possession of the AT -- Agency for Toxic Substances and Disease Registry's latest publication, which came out in August of 2020, and that's a 583-page book with over 2,500 references. Gigantic definitive tome on lead poisoning. And what they say is that levels even of 1 are toxic.

When you look in the dictionary, when I look in my dictionary anyway, the word "toxic" means poisoned. So, there it is.

So, it's -- and these numbers vary with a half-life of 9 days. So, the fact that it's at a certain level on that day doesn't mean that it wasn't higher on another day, and the lead levels are always going down.

The thing that's most important to me in this case and in all the bellwether cases that

we're discussing is that the children have thousands of micrograms of lead in their bodies, and it's my best guess as a clinician -- and it's not a guess. It's a judgment. Please excuse me.

It's my judgment as a fairly highly experienced clinician, I've probably seen more cases than most doctors you'll ever encounter, that that is due to the ingestion of water from the Flint River and that's all associated with the developmental delays and increased umbilical cord levels that we're seeing across the board. And we've discussed this extensively.

Q. That reference that you just gave me from a publication that came out in August 2020, was that on the list of reference materials that you provided? Because I don't think it was.

A. No, it wasn't. I looked at it yesterday.

Q. All right. Tell -- do you -- you mentioned it's a massive tome. Is it a -- in what form do you have it?

A. Well, I haven't printed it out. I can send, if -- Corey, if you wouldn't mind making a note. I can send you the link.

I printed it -- I don't usually print out tomes that are 500 pages, but it's called "Toxicological Profile of Lead" and it's from the Agency for Toxic Substances and Disease Registry and it's published in August of 2020.

And it's easily downloadable on the web. That's an adequate citation if you just put it in Google, "Toxicological Profile for Lead," August 2020, ATDSR, and you will come up with that 500-page document which --

Q. Would you -- yeah. Would you hold that up so we can get it on screen and I can just see the cover page of that.

Yeah, we can't see it. You're going to have to put it right in front of your face.

A. Can you see it? Am I on the whole screen?

Q. No, we can't see it. If you want to just -- Okay. There we go.

All right. So, Doctor, what -- did you -- you printed out just certain sections of it?

A. I only printed out the first 20 pages or so because I didn't want to print out 583 pages yesterday. But at the end there is approximately

100 pages of single-spaced references.

And this is a general review of all the literature on lead done by world's experts and it is consonant and consistent and invariant from what the U.S. Preventive Services Task Force has said, the CDC has said, the American Academy of Pediatrics, the EPA, the National Institute of Health and the Agency for Toxic Substances and Disease Registry.

And the summary is toward the beginning of the document where they say that a level of 1 is toxic. 1 through 10 -- 1 through 10 is what they're talking about.

I can give you the specific page reference if you'd like. It's toward the front. I'd have to pick it up again.

Q. Yeah, please.

A. Please bear with me.

Q. Of course.

A. As I say, I printed this out last night. And this probably adds another 4 hours to what I was doing. I mentioned 20 hours. It's probably 24 at that point.

It's so, so small. Single spacing.

I'm sorry. I thought I marked it, but I didn't. And it is fairly dense, 583 pages. But it is toward the beginning.

Q. All right. Well, we'll get that generated. While we're at --

A. I'm sorry. On page 5 -- there is some Roman numerals at the beginning, which is like 22 Roman numerals describing the methodology, et cetera.

But on numeral 5, actual Arabic numeral 5 as opposed to Roman numeral V, it talks about impulsivity, hyperactivity, attention, altered behavior, learning, memory, cognitive impairments and all described, levels from -- increases from 1 microgram per deciliter to 10 micrograms per deciliter. And that is Arabic numeral 5.

Q. Okay.

A. There are a lot of numerals in there. So, don't get distracted. And the 583 pages are the Arabic numerals, not the couple of hundred other Roman numerals.

Q. So, I think this is probably the second occasion on which you've mentioned some scientific literature or some resource that you had reviewed

and relied upon for some of the testimony that you're providing. So, let's just make sure there aren't any others.

A. I am pretty sure that there aren't. I did both of those things last night, and I did not send them to you. As I said, I can send the geomapping. Geomapping and Corey I think also was going to send -- we are going to send the umbilical cord blood and the ATSDTR citation as opposed to sending you 583 pages.

These all were done last night. I'm been trying to prepare intensively for this out of respect for the matter, and so I worked through last night.

Q. That's what I'm trying to get at, Doctor. So, this is the third piece of information that we didn't know about until today because you reviewed these things very recently. I just want to close the loop on it.

Is there anything else that you've reviewed and relied upon to form part of the bases for any of the testimony that you gave? As you sit here today, is there anything else that you can remember?

A. Not that I can remember. And those things were printed out last night, and there was no intention to deceive or misrepresent. I just worked on this last night pretty late and printed that out.

Q. Okay. So, getting back to this Exhibit 13, which is the test report for R[redacted] V[redacted] here, I know you said that this is information that is really, you know, the lab's information.

But with respect to this information that when the blood lead content is 5 to 9.9, there would be -- the laboratory is saying there should be a rescreen within six months, that's consistent with the standard, your own standard of practice that you had described earlier, right?

A. It's -- I would have rescreened, with the latest data, I would now rescreen within one or two months.

But, you know, I've run CLIA labs myself, so I am capable of dictating lead poisoned or not lead poisoned. I don't know who's made this decision, just so you know. In my lab I might have a different opinion as to what these levels mean.

Q. Yeah, no. I'm not talking about the lead poisoned right now. I'm just talking about the rescreening.

So, you reminded me that if you in your practice saw a level between 5 and 10, you would recommend retesting within 30 days, right?

A. To 60 days. And obviously whoever is running this lab thinks it's six months.

Q. Okay. And with respect to blood lead levels in your own practice that were reported at less than 5, you would not have recommended any repeat blood work be done, right?

A. At this point, no.

Q. I'm sorry. At this point no or yes?

A. I would not recommend rescreening if the lead is 3. Not within two months. Probably six months later. If I had an actual number of 3.3, I would rescreen within a handful of months.

Q. All right. So, turning to the next exhibit, it is -- let's see. The next VPPI report. This would be Exhibit 14 from January 16. I'm sorry. January 14, 2016.

(WHEREUPON, Bithoney Deposition Exhibit No. 14 was marked for

identification: 1/14/16 blood lead level testing report; Restricted Distribution-Confidential-RVPPI[redacted]-MCHC-MD-540069-000024.)

BY MR. ROGERS:

Q. And this is a measurement that's reported at 1.3 micrograms per deciliter, correct?

A. Yes, sir.

Q. And they have the same comments here as the earlier one.

Can you tell based on this one whether or not it's capillary or venous blood draw?

A. Would you mind starting -- is this the top of it?

Q. Yeah, here's the top right here.

A. Scroll down slowly, and I'll take off my glasses.

Q. Will do.

A. I can't tell.

Q. All right. What is -- is there anything that's significant about the fact that, at least for this laboratory that's doing the testing, that they are reporting levels that are less than 3.3 with actual numbers instead of the designation

"Less than 3.3" like the other laboratories?

What in your experience is significant or what does that mean?

A. I think it's the decision of the laboratory director.

Q. Explain that.

A. Well, the laboratory director decides what the normal range is, what the reference range is, what the abnormal range is and what levels to report based on what he or she thinks is clinically relevant or significant.

So, this is -- as I mentioned to you, in Springfield I ran Life Laboratories, which we did over a million laboratory tests a year, and I made those decisions.

I probably would not have chosen to label things the way they're doing. I disagree with what's listed below on when to chelate and when -- there are a number of things that clinicians decide. It's part of the art of medicine --

Q. Yeah, but --

A. -- based on the science.

Q. Okay. But, again, I wasn't referring

to, you know, the nomenclature or blood lead comments below. What I was referring to is the actual value of the measurements reported.

Is it -- within laboratories, is it correct that some methodologies and some equipment that's used for testing blood lead does not have the capacity or capability to accurately measure levels below a certain amount versus other equipment and laboratories that has the capacity to actually report, you know, the actual number accurately?

MR. STERN: Objection.

BY THE WITNESS:

A. I'm not sure. I have --

MR. STERN: Object to the form. Stern.

BY THE WITNESS:

A. I have not run a laboratory since 2011. There have been a lot of changes and a lot of advancements, different kinds of machinery, different potential approaches to measurement, and I'm not a laboratory expert any longer even though I believe once upon a time I was.

BY MR. ROGERS:

Q. So, you just don't know, is that right?

A. That's right. I don't know. I think I know more about laboratories than most doctors, but I can't answer your question except to say I don't know.

Q. And the next test here that we have a report on, looks like from the same laboratory. Blood lead. This is -- can you see it on the screen now. This is Exhibit 15?

A. I can.

(WHEREUPON, Bithoney Deposition Exhibit No. 15 was marked for identification: 5/22/17 blood lead level testing report; Restricted Distribution-Confidential-RVPPI[redacted]-MCHC-MD-540069-000020.)

BY MR. ROGERS:

Q. The value reported as .5. Is your interpretation that that's in micrograms per deciliter?

A. Yes. That's my interpretation. Typically that's the way it's reported.

Sometimes labs report them in micromoles, which is a very different number, and that could -- it's possible there is a micromole

level, but I would say -- micromole level there. But I doubt it. This is a -- you know, I'd bet the house that this is in micrograms per deciliter.

Q. And that's the reference range they give over here where my cursor is, right?

A. The fact that the reference range is given as micrograms per deciliter makes me strongly believe that it's not reported in micromoles.

Q. What's the difference between micromoles and micrograms per deciliter?

A. The numbers are very different. So, some micromolar reports could be .48 and still be problematic.

It has no -- it has no reference value in this case whatsoever. These are micrograms per deciliter, and that's all that matters.

Q. Thank you. Turning back to R[redacted] V[redacted] on some other issues, you have no information and to your knowledge -- strike that.

You have not seen any water lead level test reports for any of the residences that R[redacted] V[redacted] lived in. Is that correct?

A. That is correct.

Q. And with respect to the composition of

the service line at any of the residences or homes where the VPPI lived, you have no information about whether the service line or what the composition of the service line was, correct?

A. That is correct.

Q. On the subject of when RPPI VPPI stopped drinking the water after the water switchover, I want to preface this by saying, and it's in your report, too, based on your interview of the mother, you have an understanding that they moved to Flint sometime in September 2014 after having lived in Florida, right?

A. Well, I'm sure if I wrote it, that's correct. I don't know what page it's on if you need me to look at it.

Q. Well, let's just make sure. It is in your report. So if you were to turn to page 2.

A. I'm perfectly willing to accept your reading of it. I just -- you know, if I wrote it, I'll stand behind it.

Q. Sure. So, I'm just trying to clarify and make sure the facts are correct here.

Your understanding is that the VPPI lived in Florida before they moved to

Flint in 2000 -- September of 2014, right?

A. If that's what I wrote, then it is. I'm having trouble reading things with my glasses. I might need bifocals.

But if that's what I wrote, I stand behind it.

Q. Yep. So, if you take a look at page 2, the fourth paragraph on that page, it says, "Mother" -- can you see it all right?

A. I can.

Q. "Mother reported that she previously resided in Florida and she had several past addresses. Sometime in September 2014 she moved into an apartment at 3817 Woodward Avenue, Flint, Michigan."

Right?

A. Yes.

MR. STERN: Hey, Dave, is it possible to put the report on the screen?

MR. ROGERS: Of course, but I was just trying to move things along. I mean, you know, the doctor is reading it from his report.

MR. STERN: Okay. That's fine. If he's got it, that's okay.

THE WITNESS: I have it. I have all my reports on paper. As part of my preparation last night I printed them out.

BY MR. ROGERS:

Q. Yeah, Doctor, if at any time because of either poor vision, incorrect spectacles, prescriptions or whatever, you can't read your own reports, you let me know and I'll put up the report on the screen. Okay?

A. I will. Thank you for that.

Q. So, to state the obvious, from the point in time at which there was the water switchover until the date in September 2014 when the V[redacted] family moved to Flint, they did not consume water from the Flint River, right?

A. Correct.

Q. And with respect to the subject of when they, the V[redacted], including R[redacted] V[redacted], stopped drinking the water, I will put this up on the screen now so we can all see it together.

If you look at page 4, and I'll scroll to it, you can look at it and get ready while I'm getting there.

A. Page 4?
Q. Yep.
A. Okay.
Q. Oh, wait a second. Sorry. Bear with me here.
My bad. Go back to page 2.
So, it's the paragraph that begins with "Mother reported." Second-to-last paragraph on the page, and you can see it up on the screen here. In the middle --
A. Sure.
Q. In the middle of that paragraph -- this is after she talked about moving from Florida. I have it highlighted.
"Mother stated that for the first several months of her residence in Flint the family drank water from the tap."
Right?
A. Yes.
Q. And as you told me earlier, this is your summary or you're recording information that she provided to you during your telephone interview of her, right?
A. Yes.

Q. And then she says down at the bottom of that page 2, this section here that I'm highlighting or I'm underlining with my cursor, "She reported that she stopped using the kitchen sink for drinking water as soon as she learned about the lead poisoning danger in December 2014."

Right?

A. For drinking water, yes.

Q. Right.

"She did not need to change the kitchen water filter frequently because the kitchen sink was rarely used."

Right?

A. That's what I wrote, yes, sir.

Q. So, with respect to the time at which the V[redacted] family stopped drinking the water, that would have been in December 2014, right?

A. That's what I wrote, yes.

Q. What did you -- you said something about for drinking water. Does that mean that they used the water for something else? What is your reason for having commented that way?

A. I don't -- don't recall, but whether she -- she also -- well, yeah. I also wrote, "She

cooked, bathed and washed dishes in Flint River water." So, that also is utilization. I mean, the dishes would have lead on them and cooking obviously.

Cooking is especially dangerous because as you boil water or heat it, the lead in the water concentrates so that it's more toxic if it's -- if you cook with it than if you just drink it by volume.

Q. All right. Let's turn to Plaintiff WPPI, DPPI WPPI. And, again, if you have your report in front of you, that would be good.

I'm going to go through the blood level, blood lead level testing first, and you will find these references in your report on page 3, top of page 3.

You know, actually, Doctor, I'm having -- I don't see -- we have test reports for WPPI for blood lead levels. There are three of them. But I don't see that -- I see that you only have one reported on the top of page 3.

Do you have somewhere else in your report where you describe any blood lead levels -- oh, here we go. My bad. Okay. Now I see them.

They're also on page 3. Pardon me for that.

So, on the top of page 3, you report a blood -- "During the above laboratory evaluation D[redacted]'s blood level was measured at .6 micrograms per deciliter."

But we do not -- oh, we do. We have that report. I see where that's coming from. There is a mix-up here.

Okay. You know what? Let's go to the reports themselves so we can make sure we get this right.

So, let's go to the first one. This is Exhibit 16.

(WHEREUPON, Bithoney Deposition Exhibit No. 16 was marked for identification: 9/25/09 blood lead level testing report; Restricted Distribution-Confidential-DW[redacted]-WardeMedLab-MD-540097-000003.)

BY MR. ROGERS:

Q. Do you see that okay now?

A. I see it.

Q. This is a report from September 25, 2009 and it says, "Lead, 2.0," and, again, the reference

range is in micrograms per deciliter that you can see highlighted here.

So, that would indicate that the 2.0 is in micrograms per deciliter, right?

A. Yes.

Q. And then there is some -- "Blood lead in children, according to CDC classification (1991)," and there's some information here, "Less than 10 micrograms per deciliter, Not lead poisoned."

That's what the lab wrote anyway, right?

A. Yes, and that's an old standard obviously from 1991.

Q. Right.

A. Updated in 2012, I believe June of 2012.

Q. Right. Because this blood lead was taken in September 25, 2009, right?

A. Yes.

Q. At least as reported here.

And, again, can you tell from this whether this is a capillary or a venous draw of the blood?

A. Let me look at it, and if you wouldn't mind scrolling slowly.

Q. Yep.

A. I can't tell.

Q. How about this statement down at the bottom here. I'll highlight it so you can see it.

"Elevated levels of blood lead should be confirmed with a second specimen before remedial action is instituted. Elevated capillary blood specimens should be repeated using a venous specimen because of possible contamination."

But it doesn't -- that doesn't really help you tell you which one this is, is it?

A. No, it doesn't. And that's standardized verbiage that goes in a laboratory report that's essentially predetermined.

We use electronic medical records nowadays and the labs also employ standardized verbiage such as this, and it doesn't mean anything as far as determining whether it's capillary or venous.

Q. So, the next one I'm going to bring up is the blood lead level test -- this is now Exhibit 17.

(WHEREUPON, Bithoney Deposition Exhibit No. 17 was marked for identification: 3/24/16 blood lead

level testing report; Restricted Distribution-Confidential-DWPPI-WardeMedLab-MD-540097-000001.)

BY MR. ROGERS:

Q. The report is the blood lead level for, let's see, March 24, 2016. And it is reported as blood -- "Lead, Blood (Pediatric), Less than 3.3 micrograms per deciliter."

So, this is similar to some others that we saw before, right?

A. It is. But, you know, this is the kind of thing where I would disagree once again because it's -- the parents said that there was suspected exposure to lead.

So, what the Academy of Pediatrics would say is that that should be a venous level because there's a reason for drawing it. It's not a simple mandated screen. And instead of doing it by venous measurement, they did it by capillary. So, I wouldn't want my interns, residents or students to do it that way.

Q. In any event --

A. That's what they did.

Q. Yeah. In any event, that's what I

wanted to point out. You can tell this is a capillary blood draw because that's what it says here in the procedure code, right?

A. Yes.

Q. So, the last one for Ms. WPPI was on -- this is now Exhibit 18, lab report, different lab, collected on, up here it says, July 15, 2016.

(WHEREUPON, Bithoney Deposition Exhibit No. 18 was marked for identification: 7/15/16 blood lead level testing report; Restricted Distribution-Confidential-DWPPI-WardeMedLab-MD-540097-000004.)

BY MR. ROGERS:

Q. And the results are reported as .6 with a reference range less than 10 in units, micrograms per deciliter here.

So, this report, that means that this test result was .6 micrograms per deciliter lead, right?

A. Yes. And you can see they haven't updated their standardized reference ranges to be consonant with what the Academy of Pediatrics recommends or what the State of Massachusetts

recommends or the State of whatever.

I mean, that is not consonant with the recommendations that less than 10 is the reference range after 2012.

I'm just criticizing the laboratory standardized what's written there, standardized numbers that are written there at the very top.

Q. I see what you're saying.

So, you're saying here in this highlighted section where it says, "Less than 10, No action required," your point of view on this is that as of 2016 this should say something different, namely, less than 5?

A. Less than 5, yes. And greater than 5, we'd follow closely, as we discussed fairly extensively, and I won't bore you with another disquisition on it.

Q. In any event, whether you go with the 2012 or earlier reference values and the standard of care that you described earlier, this .6 result would not result in anything in terms of follow-up testing, right?

A. Correct.

Q. Okay. I think that's it for the blood

lead tests for Ms. WPPI. That's right.

Same series of questions for DPPI WPPI as we did with the others.

With respect to the water, you are not aware of any water lead level testing that was done for any of the residences in which DPPI WPPI lived. Is that correct?

A. That is correct.

Q. And with respect to the lead content in the dust or paint in the house or the soil in the yards of any of the residences where she lived, you have no information about that, correct?

A. Right. We have no information about paint or dust in any of these children and yet they're replete with thousands of micrograms of lead in their bones.

Q. With respect to the service line, you do not have any information about the composition of the service line for any of the residences in which DPPI WPPI lived, correct?

A. That is correct.

Q. Let's address the question of when DPPI WPPI and her family stopped drinking the water after the water switchover, and I can direct

your attention to page -- the top of page 4 of your report.

A. I have it.

Q. I'll go ahead and share my screen at this point so you can see it, we can all see it together.

You see that all right?

A. I do.

Q. So, this is consistent with the format of your other reports that this section is reporting information that you obtained from D[redacted] W[redacted] mom, Ms. Martin, right?

A. Yes, sir.

Q. And it says here, "In April 2014, while living at" this "East Boulevard Drive" address, "Ms. Martin noticed the water from her taps smelled of sewage and had a bad taste. She said that the water often looked yellow like urine and that she contacted the landlord about this."

Right?

A. Yes, sir.

Q. And then she said next, and I'll highlight this section here, "She contacted the landlord about this, but he said he could do

nothing. She then contacted her daughter's pediatrician who told her to stop drinking the water. This was sometime during the summer of 2014."

Right?

A. That's what she told me, yes.

Q. So, based on information that Ms. Martin provided to you with respect to the subject of drinking the water after the water switchover, D[redacted] W[redacted] and her family stopped drinking the water at some point during the summer of 2014, right?

A. That's what she told me. I tried to pin her down as to whether it was August or June or September or whatever, but all I could get was summer.

Q. Yeah. And then later on, on the subject of cooking and bathing, you asked her some further information, and she reported to you that, "In late summer 2014 the mother began using bottled water for drinking, cooking and also to bathe her children."

Right?

A. That's -- yes, that's what I wrote.

(WHEREUPON, there was a cellphone interruption.)

THE WITNESS: I'm sorry. Let me just shut this off. I apologize for the interruption. I should have shut it off before.

MR. ROGERS: No worries.

BY MR. ROGERS:

Q. For each Plaintiff now, Doctor, the bellwether Plaintiffs, the questions I'm going to ask you have to do with opinions that you have about their condition, their neurological condition basically, and any issues that you believe arise out of exposure to lead.

So, I'm going to go through this for each one of them in detail. So, if you could have your reports handy again, that would be good.

I want to start with -- go in alphabetical order again and start with E[redacted]PPI S[redacted]PPI .

What is your opinion -- strike that. Let me start over again.

So, we've already established that you haven't conducted any physical examinations or neurological examinations or neurological testing

of the individual Plaintiffs, right?

A. We have established that.

Q. So, to the extent that you have opinions about any conditions from which they suffer as of July 2020 when you wrote your reports, what is the basis for any information that you have in that regard?

A. Well, I -- the basis of the information comes from interviews from the mother, the depositions wherein parents spoke about deficits that they perceived in their children, and then the evaluation of Mira Krishnan, who is a doctor and -- Doctor of Neuropsychology.

Q. And the -- the particular conditions neurologically that you have opinions about for each of the Plaintiffs, you've just described to me the sum and substance or the total of the sources of information that you have with respect to that subject, right?

A. Yes.

Q. So, I want to go through each one and ask you about your opinions with respect to any neurological deficits or ailments or issues that the children have.

So, let's start with EPPI SPPI .

What is your opinion about any issues that EPPI SPPI has?

A. So, I have to find the section on my report with Dr. Krishnan's -- where I summarize Dr. Krishnan's finding, and I'll try and find it now. If you, by any chance, Attorney Rogers, if you have it, please assist me in finding it.

Q. Well, you have a series of pages beginning at I think page 5 and then it goes through six or seven pages.

A. Yes.

Q. Are you saying -- are you saying that all of the reported -- the descriptions of the reported neurological, neuropsychological findings that Dr. Krishnan made, those are the ones that you believe attributable to lead exposure?

A. Well, I'd have to go through each individual one, but in general the answer is yes.

I also reviewed school records, kindergarten records, et cetera, and looked at the teacher's notes and the grades of the children and whether they required developmental or behavioral intervention or the prospects of whether they

needed IEPs or 504 plans.

Q. So, how is it that you were able to determine that any of those decrements or findings that Dr. Krishnan found were attributable to lead as opposed to -- lead exposure as opposed to something else?

A. Well, we've established that these children had thousands of micrograms of lead in their bones. Lead doesn't get into your bones unless it first passes through your blood. Then it goes into the soft tissue.

So, for instance, S[redacted] had a lead level in the bones of 6.72 micrograms per gram of bone, meaning that four or five years later, in 2019 after the exposure, five years later, she had 6,720 micrograms of lead in the bone. And that's two half-lives later.

So, this means that two years ago she would have had about approaching 14,000 micrograms of lead in her bone, and two years before that she would have had 28,000 micrograms of lead in her bone. And that 28,000 micrograms of lead in the bone, I'd ask you to compare that to lead poisoning levels of 5 or 10 or 1 or 20.

Somehow this child got 24,000, whatever I just said, micrograms of -- 24,000, 25,000 micrograms of lead in her bone.

The fact that the blood lead levels didn't pick it up given the discussion we had of the triphasic decrease of lead in the blood, for instance, the one-day half-life of naive -- lead naive children, the triphasic, all that compartment stuff.

This lead is an overwhelming amount of lead. It's very concerning. It's definitively associated with levels of lead that must have been damaging to the bones -- I'm sorry -- to the brain and to the soft tissue.

I quoted for you the study by Nie from my old Boston Children's Hospital program that showed that children who had lead levels above 30 micrograms per deciliter, very severely lead poisoned by today's standards, had lead levels of 0.7 micrograms per gram of bone seven or eight years later.

You'll have to look. I don't have the Nie -- I have the Nie report beside me, but I'm not going to pull it out and waste your time.

But that is dramatic evidence that children who had lead levels greater than 30 had lower levels in their bones than this child did and that any of these -- and that lower than any of these four bellwethers had.

That is the basis of my belief that lead is the cause of the developmental disabilities that Dr. Krishnan found or in some cases that the schools mention or the need for special education, et cetera.

That is my motive for deciding that this was causative, that lead poisoning was causative.

The levels of lead in the blood given the nine-day half-life, et cetera, are meaningless to me. The levels of lead in the water or that measured -- measured by Hanna Attisha's paper are meaningless to me.

There was a big spike in the lead in the water. It's clearly systemic. It's across the City of Flint. And it resulted in a billion dollar program to replace the pipes because there was so much lead in the water.

We've mentioned the umbilical cord blood lead levels. We've mentioned the need for special

education. We were seeing 400%, 700% increases in issues.

So, this is -- I'm certain that these kids had elevated lead levels, and the fact that they're not measured in the blood I explained by the toxicologic profile that we discussed, I think repeatedly by now. I don't want to belabor the point.

Q. Well, I do have a question about that.

If the children had such high levels of lead in their bones during the period of time April of 2014 through October 2015 as you've described based on the bone lead results and then the extrapolation backwards given half-life and so forth, why wouldn't there have been elevated blood lead levels in all of the tests that we just looked at, because all of those were reported as less than 3.3?

A. Well, as I mentioned, the half-life of lead in the bones -- I'm sorry -- in the blood is very short. Relatively naive patients can ingest small amounts of lead and have it go into the bones and the soft tissue fairly rapidly so that it's not measurable.

Over a period of months these children seem to have ingested a number of micrograms. Not seem. They have ingested many, many thousands of micrograms of lead that it's incontrovertible that it's -- that it's in the bones. And we have no other source that we can identify.

Q. Is there any scientific literature that you can point me to that would support and be part of the basis for what you are just describing to me, namely, that children there -- who have blood lead levels tested at less than 3 but who have bone lead scans done, you know, years and years later, that you could point me to that establish what you've just said?

A. This is a unique case. I can point you to Erickson's Pediatric Toxicology about the triphasic declination of lead in the blood.

I can point you to Casarett & Doull's toxicokinetics chapter, Chapter 7 within that textbook, mentioning how the lead disappears from the blood fairly rapidly in not relatively naive children.

But nobody's ever had a Flint water crisis or had measurements like this before. All I

can tell you is these kids are replete with serious amounts of lead, and I have no source of it.

I did ask parents about other sources and they had no other mention of sources, like peeling paint or leaded dust or whatever.

Q. Are you familiar with the EPA modeling program that takes into account lead in dust, lead in soil, lead in water, lead in paint and so forth for evaluating blood lead levels?

A. I'm aware that the EPA says that it's about 20% of lead, lead levels in children are due to lead in the water. That's all I could say about it right now without looking at it.

Q. So, you -- when you say that you -- there is no information about other potential sources of lead for the bellwether Plaintiffs, the fact is that you don't know what any results are for tests of lead in the paint or the dust or the soil of these residences, do you?

A. I do not know because they weren't tested. However, I'm aware of systematic penetration of lead into the city -- water of the City of Flint that's resulted in major damage to children, which we've described extensively before,

as evidenced with the need for special education of 80% of the children in Flint.

And there's not any other community in the United States that I am aware of where there is an immediate and sudden increase in the need for special education.

We have no other reason, no other cause of this other than lead in the water.

Q. With respect to the issue of the extrapolation backwards from the bone lead measurements that are reported now, again, I just want to make sure I understand what you're saying about any scientific literature in support of that theory or opinion that you've expressed.

Is there any chapter from a textbook or a scientific article or paper that you can point me to in the scientific community that you're a member of which supports what you've said, that, namely, if you have a blood -- a bone lead measurement in 2019 or 2020, that you can go back in time and estimate the amount of lead that would be in children's bones four or five or six years before?

A. Well, I'm familiar with the International Committee on Radiation Protections

Data, which states that the half-life of lead in the bones of 5-year-old children is less than two years. 56% of the lead in the bones of 5-year-old children disappear in a year. So, in two years, 112% of the bone lead would disappear.

I don't have it in front of me. I didn't use it in my preparation. But I am aware of it. The International Commission on Radiation Protection.

Q. Is there anything else?

A. May I look at my bone lead file?

Q. Yeah, because, I mean, I don't have your bone lead file in front of me there, sir.

You have a separate file on bone lead papers?

A. Yes, and I sent all the data in the file to Ashley Vieux, the paralegal for Levy Konigsberg.

Okay. So, I mentioned the O'Flaherty paper, which I did send to you.

Dr. Specht I think had some work on it, but I don't have it in front of me.

No.

And if you'd like, I can dig up the International Commission on Radiation Protection.

There is a chart that I recall. I don't have it here. I didn't use it as I was forming my opinions. I've not discussed it with anybody, including Corey or Dr. Weitzman. But I know that data exists.

Q. And in terms of your opinion that a child could have large amounts of the type that you described of lead in their bones, but that when blood lead level testing was done, the test reports would come back at less than 3.3 and that that would still be consistent with high levels of lead in the bones, do you have any scientific papers or literature that would support that opinion?

A. What I have is are the measurements in the bone. This is a unique case and there is no case like it. I looked for data such as that in the scientific community. But the Flint matter is totally unique.

It doesn't obviate any of the issues that I have mentioned as being problematic, though. There is lead in the bones. Lead disappears rapidly from the blood. And there is children who were exposed to the water required special education. So --

Q. But, Doctor --

A. Go ahead. I'm sorry.

Q. That's okay. I didn't mean to cut you off.

But, Doctor, is it -- let's go over some certain elemental facts.

The changeover in the water occurred in April 2014, right?

A. Yes, sir.

Q. And at least for some of the Plaintiffs, three out of the four Plaintiffs, there was testimony from them that -- and the moms, the parents, that they stopped drinking the water sometime in 2014, right?

A. Yes.

Q. So, for those folks --

MR. STERN: Object. Dave, I tried to -- I tried to object to form and foundation.

MR. ROGERS: Yep.

MR. STERN: Thanks.

MR. ROGERS: Yep. Gotcha.

BY MR. ROGERS:

Q. So, for those three out of the four bellwethers, and the record will speak for itself

for when they stopped drinking the water, but if they stopped drinking the water during 2014, that would mean the maximum period of time that they were exposed to lead from drinking the water would be basically from May through December, if it was that point in time, 2014, right?

A. I have -- I believe so. I believe that's what we've gone through.

Q. Is it your view that whatever -- that there were -- if they did have lead in their bones, that there was no source of lead to get into their bones except the water during that period of time?

A. Well, that's a hypothetical, which I have no reason to suspect that there was another source. When I interviewed the parents, they did not describe environmental issues such as peeling paint, et cetera, to me or I would have noted it. None of them did.

Q. And yet for those bellwether Plaintiffs, there is -- and even after, there were no blood lead level tests that ever reported levels higher than 3.3, right?

A. I believe that's correct, but the bone lead levels are seriously elevated and indicate

that these children got the lead from somewhere. It's in their bodies. We have no other source.

So, many hypotheticals are possible. They could have been eating dirt and the mothers didn't report it or weren't aware of it. We can throw out many hypotheticals, that they ate paint chips or whatever, but we have no evidence to that effect.

Q. And the period of time over which the four bellwether Plaintiffs had their bones tested for lead, that would -- the results that were reported would include, in your opinion, the cumulative amount of lead that they were exposed to over the course of their whole lifetime, right, not just the period of time that they were drinking water from the Flint River?

A. It is possible they had other sources of lead intoxication. I'm not in touch with any of those sources. All I can tell you is they had that amount of lead in their bones at that time, and I have no other source for the lead other than that.

As a clinician, when I find a child with elevated lead levels, I treat -- I treat them. In this case we have bone lead levels.

You can't chelate lead out of bones because it's relatively inert to the Succimer and the British anti-Lewisite and the calcium disodium EDTA and the penicillamine.

So, we don't usually get bone lead levels. We began that this morning discussing how we don't usually get bone lead levels.

But we have -- I have only been able to identify one source and any other source is purely hypothetical, and yet these children are replete with lead in their bones and it had to come through their blood and their soft tissues.

Q. So, is there -- just to finish this subject off.

There is no scientific paper or literature because, as you said, this is a unique situation in your opinion, that would correlate the relationship between bone lead amounts that were measured years later and what the amount of blood lead levels would be during a time of exposure?

A. Well, no. I mentioned the Nie paper out of Harvard Medical School and Purdue where we had 11 children with lead levels greater than 30 micrograms per deciliter whose lead levels when

they were measured eight or ten years later were I believe 0.7 micrograms per gram of bone and 0.7 -- now we are looking at a child -- currently we are talking about S[redacted]. Instead of 0.7, she has 6.72, about -- maybe my math is wrong -- 100 times more.

Q. Can you show me -- sorry.

Is that Nie paper in your folder there with the bone lead?

A. Yeah, I believe I sent it. I can grab it.

Q. Yeah, would you. Just show me the title page just so I make sure I know which one you're referring to, please.

A. Sure. It is entitled -- it's from Biomarkers, 2011, September: Volume 16 (6), pages 517 through 524.

Q. Can you hold it up so I can see it. That way I'll be able to probably recognize it better.

A. Hold on, please.

I printed it out of the NIH website, not the Biomarkers website. So, I'm not sure if I sent you the Biomarkers.

Can you see it?

Q. I do see that. Okay. Thanks.

Now, the testing that was done by the Nie group, was that bone lead testing done with the KXRF machine or PXRF machine?

A. I'm going to have to dig into it. This is a very dense scientific paper. Is it -- if it's worth your while, I will certainly do it.

Q. Let's do it, yeah, please.

A. Okay. I'll need to find the methods. Bear with me, please. I'm trying to accede to your wish, and I'll do it as rapidly as I can.

KXRF.

Q. That's what I thought. Okay. Thanks.

So, that didn't -- they were reporting in that paper bone lead measurements that were derived using a KXRF of the --

A. The low --

Q. Let me finish, please, yeah.

-- of children who had reported blood lead levels of greater than 30 micrograms per deciliter at some point in time before. Is that right?

A. That's -- that's the number I recall.

11 children with lead levels greater than 30 micrograms had lower tibial -- had tibial measurements of lead, and the average child of these 11 had a measurement on KXRF of 0.7 micrograms per gram of bone.

Q. And how -- what was the duration of time or period of time in between the blood lead measurements and then the KXRF bone scan measurements, Doctor?

A. There were 11 children. They had their blood tested. I believe they were toddlers, and I believe at measurements they were age 8 to 13. So, maybe 10 years, 11 years, something like that.

Q. Okay. Got it. Thanks.

So, turning back to the question of the diagnoses that you have or opinions about any issues or problems that the children have. Here are my questions for you, and we'll start with EPPI SPPI

So, what are the specific conditions or neurological issues that EPPI SPPI has that you believe are caused by lead exposure?

A. Let me just go through. This is based on largely on Dr. Krishnan's report.

Required special education, special help for reading and mathematics both. He received special education and special help and is in an, open quote, "an intercession," close quote, for both. He's described as having a reading problem.

Q. Can I stop you there for a second, Doctor.

Where are you reading from?

A. I'm reading from my own report on page 5.

Q. Thanks.

A. In the paragraph that begins, "My review of E[redacted]s school records."

His brother Malachi also drank leaded water and also requires an intercession, which is an intervention in special education parlance.

They each drank about a liter of leaded water a day or of Flint River water per day.

But I just recapitulated what Dr. Krishnan mentioned.

She mentioned that his math skills were a year below grade level, did not evidence significant discrepancies. He was borderline mentally impaired in terms of his visual memory.

There is extensive literature on all of these deficits as being caused by lead poisoning.

His basic focus attention was good. However, he was impulsive, which is known to be an issue.

Subtle executive functioning deficits and challenges. Executive functioning is a relatively abstruse measure of cognition. But it basically looks at organizational skills, understanding of the world around you so that you can prioritize things.

So, for instance, a child who has an executive functioning difficulty might be told by his teacher to "Go to your desk, open your desk, open your book on math, open it to page 24, read the first paragraph and then fold your hands to let me know that you're done." And the child with issues with executive functioning and short-term memory might just fold his hands.

So, there are a number of very subtle deficits, like reading deficits. Typically when a child is young, they might be able to read words but later on when they get to the 5th grade or so and they need to read to learn, they can't do it.

So, they can read, but they can't read to learn.

So, there are a number of subtle educational deficits that we get into with lead and it's not all IQ.

So, for instance, this child's IQ is 99 and yet he would have difficulty, in my opinion, based on these reading and math deficits, executive function deficits, issues with focus and attention, as he ages out and gets to higher and higher levels of education.

There may be more in here, but I have documented it all.

Q. So, what did you do to rule out other possible causes for those conditions besides lead exposure from the water?

A. Well, we got family history. For instance, that's why Malachi, I mentioned that he also requires intercession.

That was -- these reports, by the way, are highly abbreviated based on thousands of pages literally. I'm sure if you go to the -- go to your files, you will see there are thousands of pages.

But part of the family history involved looking at his parents, looking at his siblings for

educational issues, looking at grandparents, et cetera.

The only positive family history I found was Malachi having a problem, and he was also in an intercession but he also drank the water.

I asked all the parents about other sources of lead intoxication, and I'm sorry that I didn't put it in my report, but that's standardized approach for anybody who is looking at children for lead intoxication. And I found no other sources.

Q. Yeah, but, Doctor, maybe you misunderstood my question or I didn't phrase it right.

What did you do to rule out other causes for these conditions besides lead exposure?

A. Well, as I said, family history, educational history of the parents, et cetera. But -- and, of course, Dr. Krishnan found findings that were consonant with lead intoxication.

Q. Yeah, but Dr. Krishnan testified that with respect to the children's findings or the findings for the children based on her testing, that she had no baseline level or no testing to compare them to, so that there was no evidence of a

decrement from previous levels.

Is that your understanding?

A. I'm not aware of that testimony, but I take your word for it.

Are you, by any chance, familiar with the Bradford Hill criteria for causation?

Q. Well, let's -- let me ask the questions, and then we can talk about those things later.

A. Let me give you a disquisition --

Q. Yeah, no.

A. -- because the deficits that we're seeing are consistent with lead poisoning. The weight of the evidence supports it. The timeline is consistent. There was lead exposure and then there were decrements in their development.

There was a dose gradient, in other words, the higher the lead level, the worse the lead educational issues for children. It's biologically plausible, and there is experimental evidence to support the lead effect.

That essentially meets all the criteria for causation that I can find in the literature. It's all consonant and consistent with lead intoxication.

Q. Okay. Getting back -- thank you for that. Getting back to my question.

Is it correct that Dr. Krishnan did testing in 2020 on these children but she did not have any neurological, neuropsychological testing prior to that, right?

A. If she testified to that effect, then I believe her.

Q. So, to the extent that there were any reported abnormalities or findings in the testing, there was nothing, no neuropsychological testing to compare it to from a previous point in time, right?

A. There is no prior testing, but these data meet the criteria for causation as described in my earlier statement.

Q. Okay. And the Bradford Hill criteria for causation, is that a medical standard or what is it that you're referring to?

A. It's a standard that scientists often refer to when they're looking to establish causality.

So, for instance, for many years, people, quote-unquote, "knew" that cigarette smoking caused lung cancer and cardiac disease and

stroke and asthma and all the things that we now know smoking results in, but the cigarette companies were able to argue that those things were not necessarily causal but, rather, simple associations.

So, while it's true, they argued, that adults had more lung cancer if they smoked, it didn't prove in any individual case that the smoking resulted in that lung cancer.

And they got away with it for decades and decades until the associated -- the evidence of association became so strong and they were able to determine that that met the Bradford Hill criteria for consistency, dose response, weight of the evidence, timeline of being exposed and then getting lung cancer, et cetera.

So, that's a fairly standard approach to understanding a clinical issue to determine whether something causes something else clinically.

We can't do experiments on children and expose them to a dose of lead level -- to a dose of lead. So, it's been challenging. It was challenging for many years to prove that lead caused problems.

But there are no ethical experiments that we can do, so we have to go into the Bradford Hill standards or other causality standards.

There are many criteria. There is scientific method criteria, which I really am not at -- not able to discuss in any detail as I sit here now.

But it meets standards for causality because we know that these kids have deficits that are consistent with what lead -- with the kinds of deficits that lead causes.

Q. So, for the deficits that you just described for EPPI SPPI that you believe to be caused by exposure to lead, what was the source of the lead for him? And I want to go through each one individually.

A. Well, the only source I have been able to identify is the water.

Q. Did you take into consideration whether or not there would be any exposure to lead from paint, dust, soil for EPPI SPPI?

A. I asked the parents about that, and I didn't come up with anything.

Q. So, is it your opinion that lead in

paint, dust and soil did not contribute to any degree in any amount of lead that EPPI SPPI experienced?

A. I have no evidence of that. I've agreed that such things happen and do happen, but I don't have evidence of it is what I'm saying.

Q. So, is -- in your opinion, is the only source that you're aware of that would cause any lead in EPPI SPPI lead in the water?

A. That's the only source I was able to identify.

Q. And how did the lead get into the water that EPPI SPPI consumed?

A. Well, I'm not an expert in plumbing and such. But as I understand it, the water in Flint was switched from the Detroit source of Lake Huron, switched to the Flint River, and no organophosphates were added to mitigate the deterioration of the lead and galvanized steel pipes.

This resulted in lead being leached from the pipes and also a decrease in level of chlorine in the water, which resulted in bacterial infections.

Just as you chlorinate your pool to prevent bacterial overgrowth, having levels of chlorine is protective. That's why we add chlorine to the water.

So, there were bacterial infections and also lead entered because of the low chlorine level, resulting in the lack of coating in the pipes, and also lead leached into the pipes -- into the water. I'm sorry.

Q. If the pipes from the water treatment plant to E[redacted] S[redacted]'s home, none of those were lead, how did the lead get into the water that he was drinking?

A. I'm not aware of none of them being lead. I'm not aware of the pipes in -- that led directly to his home. I know that there was systematic error in the measurements of what percentage of pipes were problematic in terms of lead.

I know that there was a bump, a doubling of problematic elevated lead levels in the community. I know that umbilical cord blood levels went up, et cetera, all the things I won't bore you with that.

But I know that after the water was switched, all these things occurred.

Q. And have you reviewed any other experts' reports that would form the basis for which you've determined that lead got into the water that EPPI SPPI was drinking that caused his exposure to lead so as to have caused these ailments that you described earlier?

A. I didn't review expert reports. I reviewed the literature as we have been discussing with your guidance.

Q. Thanks. Do you have any basis or are you aware of any facts that would -- strike that.

Do you know how much, how much the lead content was in the water that EPPI SPPI was consuming?

A. No.

Q. Do you know what the dose amounts were for EPPI SPPI, that is, how much lead was in the water that he was drinking and how much of the -- how much water he was drinking?

A. I know how much water he was drinking. Roughly a liter a day.

Q. Okay. But you don't know how much the

lead content was in that liter of water that he was drinking, right?

A. I don't have his specific numbers nor do I have specific measurements in any of the other bellwether children.

But let me give you an example. If a child ingests water at 10 micrograms per liter, in 30 days they will ingest 300 micrograms. If they ingest more water, they will ingest more lead. I mean, it's all over the place. 15 micrograms per deciliter will yield 50% more lead ingested, et cetera. And then if they use it for cooking or if they boil it, it's even worse.

Q. What was the duration of time over which EPPI SPPI was exposed to or consuming water with lead in it?

A. We just went over that. I don't recall the number of months that it was.

Q. Would there be -- the -- do you have an opinion as to whether or not there would be any continuing contribution to the lead that were in these children after the point in time at which they stopped drinking the water?

MR. STERN: Object to form.

BY THE WITNESS:

A. I have no knowledge of that.

MR. STERN: Stern. Object to form.

THE WITNESS: May I answer?

MR. STERN: Yeah, of course.

BY THE WITNESS:

A. I have no knowledge of that.

BY MR. ROGERS:

Q. So, as of the point in time at which they stopped drinking the water, if the source of lead in their bodies was from the water, you're not aware of there being any additional lead exposure for them, right?

A. I'm not aware of any additional exposure for the four bellwethers.

Q. So that once they stopped drinking the water, whenever that was based on the testimony and the facts, that would be the point in time at which their lead exposure from water would have stopped, right?

A. I'm not sure. I'm not an expert in plumbing, as I said. I'm not sure if some -- there might be some local effects or ongoing water line effects. I think you'd have to talk with the

people from Vermont -- Virginia Tech or an expert in plumbing. There may have been some ongoing exposure. But, I mean, it's not within my realm of expertise.

Q. Yeah, but I'm saying that once they stopped consuming the water, drinking the water, then how could there have been any continuing --

A. I --

Q. -- exposure to lead getting in their bodies?

A. Yes, I see your point. If they weren't exposed to the water, then there was no ongoing ingestion of lead.

Q. Gotcha. And that's true with respect to all four of them.

So, at whatever point in time it was for each of the individual bellwether Plaintiffs, once they stopped drinking the water, they were not exposed to any lead from the water from that point forward, right?

A. If they weren't drinking it, they weren't exposed, yes.

Q. Well, I -- the way that you sort of answered the question gave me some cause like you

were trying to qualify it. So, let me try again. Maybe you weren't. But just to be clear.

There was a period of time during which these four bellwether Plaintiffs were drinking water that you believe to have contained quantities of lead in it that caused these problems that Dr. Krishnan noted, correct?

A. That is correct. I didn't mean for my answer to be subjunctive. It was definitive.

Q. I don't know what that means, so I'm going to keep ask you questions. Hold on.

A. It --

Q. Let me just finish.

So, then the lead that caused, in your opinion, the ailments and conditions and problems that these children experienced that you've described that Dr. Krishnan reports, that was due to their having consumed water with lead in it for a certain period of time, right?

A. Yes.

Q. And once they stopped drinking the water, the exposure to the lead that they consumed so as to have caused any of these problems stopped, right?

A. That is yes except for the bellwethers who cooked with the water after that, but they weren't drinking a liter a day anymore. That was my -- I didn't mean to be hedgy.

Q. Okay. With --

A. The answer is yes and possibly.

Q. Okay. So, with respect to the extent to which there would have been any continuing exposure due to cooking, did you attempt to quantify that in any way similar to what you did with the amount of water that they were drinking?

A. I couldn't -- I couldn't get a handle on that, no.

Q. And I think this is -- I think I know what your answer is.

But with respect to what any actual water lead level content was, at any point in time from April 2014 through the end of 2014, you haven't conducted any analysis or estimates of that, right?

A. I have not.

Q. And same thing with respect to blood lead levels. You haven't attempted to do any calculations or determinations as to what the blood

lead levels were for any of the bellwether Plaintiffs from any point in time from April 2014 through the end of 2014, right?

A. I have not. The answer is yes to your question of "right."

Q. Gotcha.

A. When you put the "right" at the end, it confuses me sometimes. But the answer is affirmative.

Q. Thank you.

MR. ERICKSON: We have been on the record about an hour and a half. Do you want to take a short break?

MR. ROGERS: Yeah, okay. It's about 2:30. That sounds good. Let's take about a -- you know what, let's take about a ten-minute break this time. So we'll return at 2:45. Okay?

THE VIDEOGRAPHER: The time is 2:34 p.m., and we're off the record.

(WHEREUPON, a recess was had from 2:34 to 2:51 p.m.)

THE VIDEOGRAPHER: The time is 2:51 p.m., and we're on the record.

BY MR. ROGERS:

Q. Doctor, I'm trying to get to a series of questions that might save us some time, and I don't -- I frankly can't remember if I asked the questions correctly so as to achieve that in the last 10 or 15 minutes of the questioning before we took our break.

So, in order to do that, my question to you is: For each of the questions that I asked you about whether or not -- well, let me just try it this way.

Remember I asked you questions about for each Plaintiff what was the source of the lead exposure? And I just want to make sure that the answer is the same for each of these four bellwether Plaintiffs because I'm not sure if I asked the question that way or not. I might have been asking the question just with respect to the first one, EPPI SPPI . Okay.

So, with respect to all of the four bellwether Plaintiffs, the source of the lead exposure for each of them that was the cause of the various ailments that Dr. Krishnan found and that you described was lead in the water, right?

A. Yes.

Q. And, similarly, with respect to all of the Plaintiffs, you -- in your opinion, exposure to paint, dust or -- sorry -- lead in paint, dust or soil did not contribute to their conditions, causing their conditions, right?

A. I have no evidence of that. That was the answer.

When you say all of the Plaintiffs, you're meaning just four bellwethers.

Q. Exactly, yeah. The four that we're talking about here, yeah.

A. That's what I'm answering, just about the four, right.

Q. And that's what I'm trying to make sure we got on the record here.

Same question for all of the four bellwethers. The period of time over which they were exposed to lead from the water from having been drinking the water would be the period of time based on, you know, whatever period of time it is that they said they were drinking the water, from April 2014 through the period of time that they stopped, right?

A. Yes.

Q. And you don't -- for each of them, you do not know how much lead was in the water that they were drinking, right?
A. Specifically, no.
Q. And with respect to the duration over which they were drinking it, I think we covered this, but for each of the four, it would be from the switchover to Flint River water at the end of April 2014 until such time as they stopped drinking it, right?
A. Yes.
Q. And, so, with respect to all four of them, the exposure that each of them had to lead in the water except for cooking would have stopped as of the point in time at which they stopped drinking the water, right?
A. Yes.
Q. And then so therefore to the extent that lead caused any of the problems and conditions that Dr. Krishnan described and that you believe was caused by lead, that would have -- the exposure period would have ended as of the point in time that they stopped drinking the water, right?
A. Yes.

May I make one other point?

Q. Let me just finish if you don't mind. Sorry. Let me just finish this line of questioning if you don't matter -- if you don't mind.

And in terms of the actual amount of lead in the water, during the period of time from April when the water switchover occurred until such time as they stopped drinking the water, you don't know what those levels are, right?

A. No.

The point I wanted -- I'm sorry. When you're done, I want to make a point.

Q. Yeah, I know. I understand. Let me just finish this.

And then with respect -- you didn't do any calculations or estimates for any of the four as to what the water lead levels would be for them, right?

A. No, I did not.

Q. And same question with respect to all four, you didn't attempt to do any estimates or calculations as to what the blood lead levels would be based upon whatever amount of lead was in the water that they were drinking, correct?

A. I did not make such estimates.

Q. Okay. Now, please, you wanted to explain something or add something. Go ahead.

A. My point is that these children went to school. The school's water was known to be contaminated. I don't know which schools they attended. They went to grandma's house or their aunt's house. You know, they were all over Flint. So, their exposure to water is not simply to the water in their home.

Q. Well, did you ask the parents that question, namely, did you tell your child as of the point in time at which you decided that the family should not be drinking the Flint River water that they should stop drinking the water in schools, at grandma's house or anywhere else they went?

MR. STERN: Object to form.

THE WITNESS: May I answer?

MR. STERN: Yes.

BY THE WITNESS:

A. I did not tell them that. I'm just bearing in mind when I went to Flint in 2015 or whenever it was how all the school water fountains were closed because they were found to be positive

for high levels of lead. So --

BY MR. ROGERS:

Q. So, what -- I'm sorry. I didn't ask you what you told them. I asked you whether or not you asked the parents if they had said to their children, as of the point in time at which they stopped -- they decided to stop drinking the water as a family, not to drink water at grandma's house or at schools?

A. I didn't ask them that question. But, for instance, all the kids --

MR. STERN: Hey, Dr. Bithoney, Dr. Bithoney. Just let's -- two things. One, just let me insert my objections, so pause for a minute before you answer.

I'm going to object to the form of the question.

And also, if I object to the form, unless I tell you don't answer, feel free to answer. It's just me preserving the record.

So, I object to the form of the question and go ahead and answer.

BY THE WITNESS:

A. Right. I didn't ask them that question.

But I know, for instance, that those children went to school and to other places in Flint.

We also determined that there was systematic penetration of lead in the water.

BY MR. ROGERS:

Q. Did you complete explaining whatever it was that you wanted to add so that we can move on to another subject?

A. Yes, yes, I did.

Q. And when --

A. Yes.

Q. When you said you're at the school and the water fountains were taped over and, you know, saying, "Don't drink. Caution," or whatever it was, "Don't drink the water," do you know when in Flint it was that the schools determined that the kids should not be drinking the water from the water fountains?

A. I do not.

Q. And I think you answered this. But what is your best memory of when you were there that those -- that you saw those things on the water fountains?

MR. STERN: Objection; asked and answered.

BY THE WITNESS:

A. I believe we discussed 2015, late 2015, but I'm not 100 percent sure.

BY MR. ROGERS:

Q. So, we're going to now go into the invoices that Mr. Stern just provided to me, and we're going to mark them all as I discussed with Corey Marut, not Corey Stern, the documents.

Oops. I almost canceled myself out of the meeting here, so that was a mistake.

Can you see my screen now, Doctor?

A. I can.

MR. ROGERS: So, Corey Marut, like I said, these are all going to be Exhibit 4.

(WHEREUPON, Bithoney Deposition Exhibit No. 4 was marked for identification: Invoices produced from William G. Bithoney, MD to Corey Stern, Levy Konigsberg.)

BY MR. ROGERS:

Q. So I'm hoping, Doctor, we can find references here to -- that will help you remember when it was that you were in Flint during those meetings that you described earlier.

So, here's it looks like an invoice from August 1st, 2017, and it describes things that you did from July 24 through the 27th, 2017. And I haven't read these yet, so bear with me. I just got them, and I'm going through them for the first time with you now.

Standard physical exam, neuromaturational assessment, Denver Developmental Screening Test for seven clients, follow-up, et cetera, et cetera, multiple e-mail communications with staff members, Corey Stern.

I think you answered this before. But this is the point in time at which you went out to Flint to do some examinations of some of the Plaintiffs, right?

A. Yes, and I had said that I thought it was 2017 or 2018. Clearly it was in 2017.

Q. And, so, the seven clients, your best memory is and your testimony was earlier that those were -- none of those seven were the four bellwethers that we're involved in now, right?

A. That is -- that is the case. They were not the four bellwethers that we're discussing.

Q. Then you have some receipts for hotel

and airfare and stuff like that here. Okay.

This does not describe the -- let's see what kind of a tipper you are. $9 out of 43. Well, that's not bad.

You didn't -- this was not the trip when you had the meeting at the school that you described earlier, correct?

A. No, that was --

MR. STERN: In fairness, Dave, I think that because that receipt was submitted to me, that was my tip. But that's fine. Keep going.

MR. ROGERS: What if he were to give a 100 percent tip?

MR. STERN: I trust the man. I trust the man. The man -- he never does things like that.

BY MR. ROGERS:

Q. The next one is an invoice from April 20, 2020, and this one -- it looks like there is an itemization of what you did at various points in time, and let's just go through this.

So, you spent eight hours -- oh, I see. Wait a minute. It's not itemized by dates.

Over what period of time did these actions that you took working on the case take

place? Because the invoice is dated April 20, but it doesn't say individual dates when you did the work.

A. I can't give you the individual dates.

Q. Would these, the work that you did here, relate to the four bellwethers?

Oh, I see. Wait. Here's something that will tell us.

For the 6 hour entry, the second one, it was "Review of 14 cases of children," et cetera.

So, that would have been the 14 that existed at that period of time, right?

A. Yes.

Q. So, the "Extensive de novo literature search performed specifically for Flint," the first entry here, 8 hours, "evaluating the neurologic, physiologic (sic), biomedical complications of blood lead levels less than 5 and preparation of a synopsis of these topics," did you actually prepare a written memorandum of some type or report?

A. No. And the literature that I reviewed had a lot to do with bone lead levels and half-lives of lead in the blood and all the things we've been discussing.

I typically don't charge for standard review of literature on, for instance, developmental impact of lead because I feel that that's on me.

But because this case was so unique, given what we've discussed earlier with the water issue and such, I did some de novo research. Typically I won't do that.

If it was just a simple straightforward leaded paint case, there would be no charge for developmental literature searching.

Q. But my question is with respect to the preparation of a synopsis of these topics, what does that mean?

A. I believe that I sent Corey something about low level leads. I'd be hard-pressed to pull it up for you at this point.

Q. All right. The de novo literature search that you performed, in the list of references that you provided to us for production, does that include the literature that you searched during this eight-hour period?

MR. STERN: Dave, objection. If I could -- could we go off the record for a minute?

MR. ROGERS: Well, I'd like an answer to that question first but...

MR. STERN: I'm going to instruct him not to answer until we talk because this is a different project that he did for Flint, and I can explain it off the record.

MR. ROGERS: All right. Go ahead.

So, you're instructing him not to answer at this time, and let's go off the record and we'll determine what to do. Okay.

THE VIDEOGRAPHER: The time is 3:05 p.m., and we're off the record.

(WHEREUPON, discussion was had off the record.)

THE VIDEOGRAPHER: The time is 3:07 p.m., and we're on the record.

BY MR. ROGERS:

Q. So, Doctor, I'll just change the question up a little bit. Mr. Stern had provided a description of what this work was related to.

I just simply want to know if the literature that you reviewed during this time as described by this time entry here, at some point before April 2020, that relates to various

neurological and other problems associated with low blood lead levels, does that -- did you include that literature in the list of references that you provided to us for purposes of preparation of your deposition today?

A. Well, I didn't use -- I provided you everything that I used during my preparation. I imagine that there is an overlap and there were other pieces of literature that I used for this I'm sure.

But everything I used in active preparation for this -- for these four bellwether cases I provided for you except as detailed earlier in this deposition, and we've agreed to provide that information to you. And two of the three things I think I did last night, as you know, or maybe three of them, and I did not provide them to you, but we will.

Q. Okay. Here's an important one on this 9 hour entry. "Review of laboratory reporting methods in the Flint Children's Center and HPPLS Laboratory."

What's that all about?

A. I was looking at how they measured the

lead levels and how they were reporting them.

Q. So, where is the work product that resulted from this review?

A. Well, I didn't write anything about that, as far as I know.

Q. What did you --

A. Whatever work product there is I supplied to Corey.

Q. Well, in terms of reviewing laboratory reporting methods in the Flint Children's Center and HPPLS Laboratory, what did you learn about that?

A. We were looking at how they measured the lead levels, was it atomic absorption spectroscopy, for instance, how they reported the lead levels, did they report levels less than 3, were they capillary, were they certified by CLIA, were their technicians certified by CLIA. The kinds of things we've discussed.

Q. Well --

MR. STERN: I'm just going to object to -- I'm looking at this invoice. I'm just going to object to all the questions related to the invoice as it was part of the settlement negotiation and it

was -- all of it was done in preparation for mediation, settlement discussions.

I'm not going to instruct him not to answer. I'm not worried about what he is going to say. I just don't think that this is admissible evidence.

MR. ROGERS: Well, I don't know, Corey. If you look at these entries, "Literature review of the consonance between venous and capillary, standard deviation and standard error of the mean," capillary versus others, what the labs reported and what it all means when they report it, et cetera, and what it means, you know, about less than 3 versus 3.4, et cetera, these are all definitely pertinent to --

MR. STERN: You can ask him about those issues, as I think you already have. I just --

MR. ROGERS: But the problem is that I asked those questions earlier and the doctor said he didn't have the information, but it looks like he spent 9 hours' worth of work doing it for purposes of the case anyway. So, I think I'm entitled to it.

BY MR. ROGERS:

Q. What was the result -- so, Doctor, did you write up a report on all these subject matters?

MR. STERN: Objection. He gave me information, and I wrote up a report. Not a report, but I wrote up a position paper for the State of Michigan as part of our settlement negotiations based on the conversations that I had with Dr. Bithoney. I don't think it's appropriate for you to get my report.

BY MR. ROGERS:

Q. Well, how did you, Doctor -- if you conducted a review of the laboratory reporting methods in Flint's -- Flint Children's Center and in this particular laboratory, how did you report or record what the results of that review was?

MR. STERN: It was a two-hour -- Dave, there is a two-hour telephone communication and e-mail communication.

MR. ROGERS: Corey, I'm asking him. Okay. I'm not asking you.

BY MR. ROGERS:

Q. Doctor.

A. It was a verbal communication with Corey and Ashley discussing all this. And as far as I

can tell, everything that was involved here we've already gone over.

Q. Yeah, but you didn't -- you didn't describe to me any information about what you learned about the reporting methods for these two laboratories.

A. As I sit here today I don't recall exactly what I -- what I learned because I gave everything verbally to Corey.

Q. But were there -- when you did a review, you must have reviewed documents or something having to do with these two centers, right?

MR. STERN: Object to form.

BY THE WITNESS:

A. Well, I know I called --

THE WITNESS: Go ahead, Corey.

MR. STERN: Object to form and foundation and same objection about the settlement negotiations.

BY THE WITNESS:

A. I'm not exactly sure as I sit here several months later exactly what I did. But I did review literature on capillary blood levels, their accuracy, how labs reported them and the like.

And as far as I understand, we've

covered all of the data in the earlier parts of the deposition. Everything that I did here has been gone over.

BY MR. ROGERS:

Q. Well, I disagree. So, let's --

MR. STERN: Objection to the form. Move to strike the colloquy.

BY MR. ROGERS:

Q. And then you say here, "Preparation of final report of Pb levels less than or equal to 3.3," and so forth and so on.

You actually prepared a written report on that subject, right?

A. As I sit here I don't recall preparing the report. I only remember the verbal discussion. I'll confer with Corey and see if we can dig it up if I did do one.

Q. Well, let's -- I guess we'll have to take that up at another time.

But sitting here today, do you have any memory about what you learned with respect to the -- how the laboratory reporting methods for these two centers, what that was?

A. There was nothing extraordinary that I

found. I found that they reported lead levels less than 5 or lead levels greater -- less than 10 and all -- as relevant or not relevant and some labs looked at levels of 0.7 and reported them specifically and others didn't.

I really believe we've gone over everything verbally in this deposition. I'd be at a loss to look here and see if there is anything we haven't covered that I went over when I did this with Corey.

Q. What did you --

A. Go ahead.

Q. Go ahead. Sorry.

What did you find out in your intensive literature review about the consonance between venous and capillary blood levels?

A. I determined that -- the headline is that the American Academy of Pediatrics felt that capillary blood lead could still be used as a screen, that the standard deviation or standard error of the mean, depending on the lab, was plus or minus 1 microgram per deciliter. The things that we've discussed already.

Q. And what you found out about the -- can

you explain or describe what you found out about this next one, "Review of the standard deviation and standard error of the mean in capillary blood lead levels with emphasis on findings in capillary blood levels less than 5"?

A. Capillary blood measurement --

MR. STERN: Same objection. You can answer.

BY THE WITNESS:

A. I learned that capillary blood lead levels are less accurate below 5 micrograms per deciliter and especially below 3 micrograms per deciliter than they are at levels of 20 or 10.

When you get down to very low levels, for instance, when you have a level of 2 and the standard deviation is 1, that is a 50% standard deviation or standard error, if you will. Whereas, when your level is 20 and you have a -- an error ratio of 1, that's a 5% possible error rate.

So, that's the kind of thing I looked at. And it was based on a laboratory evaluation, not an evaluation of children.

Q. What laboratory evaluation?

A. Well, looking at the HPPLS Laboratory.

MR. STERN: Dave, can I just have a standing

objection just to the whole line?

MR. ROGERS: Yes, sure, of course, yeah.

BY MR. ROGERS:

Q. And, finally, this preparation of final report, et cetera, what did you include in that report?

A. I can't say that I recall. I've done so much work since then. I'd have to go back to Corey and see if we could find it.

Q. So, let's close out this invoice, and we will go on to the next one. Again, this is all part of Exhibit 4.

MR. STERN: Dave, can we go off the record for one more second so I can explain one more thing to you off the record?

MR. ROGERS: Sure, yeah.

THE VIDEOGRAPHER: The time is 3:17 p.m., and we're off the record.

(WHEREUPON, discussion was had off the record.)

THE VIDEOGRAPHER: The time is 3:19 p.m., and we're on the record.

BY MR. ROGERS:

Q. So, the next document is an invoice from

July 25, 2020. And, Doctor, I'll -- you probably remember, but that's the date on -- the date of your reports.

So, would this invoice basically describe the amount of time that you spent doing background work and then -- well, let's just go through it. That's the easiest way to do it.

It all relates to the work that you did for preparing these reports for the 14 bellwethers at that time, including the four, right?

A. I believe it did include the four, yes, you're correct.

Q. So, it says here you spent 4 hours doing initial record review. Was that for all 14?

A. I looked at the sum total of my hours and divided it by 14.

I did an initial review based on Dr. Hoffman's work. Dr. Hoffman, who is not a party to this matter at this point, was the psychologist that we mentioned earlier.

So, I generated a report based on Dr. Hoffman's data, and then it turned out that I needed to do the cases all over again using Dr. Krishnan's data. So, I actually ended up doing

28 case reports, if you will.

Q. So, you had done reports based upon neuropsychological testing done by Dr. Hoffman?

MR. STERN: Object to form and foundation.

BY THE WITNESS:

A. Yes. And since he wasn't the expert that was being used in the case, I had to do everything again. So, it doubled the amount of time.

And so what I did was I divided the number of hours I spent by the number of cases that I did and came up with the amounts.

MR. STERN: Objection. I also want to note that Dr. Hoffman never performed any neuropsychological examinations.

The reason why we had to switch experts, as I've stated on the record, is because Dr. Hoffman was unable due to COVID to travel to Michigan to do the evaluations in person and I was not comfortable with him doing them any other way.

BY MR. ROGERS:

Q. Well, let's just try to get through this exhibit here in terms of what it means in time and actual work that you did.

You have an entry here of 4 hours for "Initial record review," and you have here at the first sentence, "Please be advised that all billable hours have been divided equally among the 14 clients."

So, does that mean that the total amount of time that you spent reviewing records for all 14 bellwethers was 4 hours?

A. No, they're divided. They were actually -- I had to do 14 cases and then because Dr. Hoffman wasn't -- wasn't involved, I had to do 14 case -- the same 14 cases again.

Q. But wait a second.

You described at length and mentioned several times, Doctor, that you received thousands of pages of information and medical records and things that you reviewed. I understood you to mean for the four bellwether Plaintiffs that we have now. And here you have an invoice where you say that you spent 4 hours doing initial record review on 14 clients, 14 bellwethers.

Is that right? Is the total amount of time that you spent reviewing records on the 14 bellwethers 4 hours?

A. No. And this is -- I ended up charging significantly less because I thought the bill was too high.

But each case, I reviewed the records initially when Dr. Hoffman was involved and then I had to review it again. Each case times 14 had many thousands of pages of depositions, lab tests, hospital records, pediatricians reviews, school records, and the like.

Q. What does this 4 hours mean? You say you did -- you billed 4 hours of initial record review of what?

A. For each -- for each child I discounted it significantly. I don't remember how much time. But if I were -- if I were to do this again, I'd say for each child I spent 10 hours or 8 hours. I just felt the bill was getting outrageous and so I discounted it significantly.

Q. So, you discounted it from 140 down to 4?

MR. STERN: No. Objection. Dave, you're not reading the bill.

MR. ROGERS: I'm trying to figure it out.

MR. STERN: 14.5 hours per case. That's one

case times 14 cases.

MR. ROGERS: No.

MR. STERN: Yes.

MR. ROGERS: Listen, listen, Corey, let me ask the questions and we'll get through this faster.

BY MR. ROGERS:

Q. You say here, Doctor, 4 hours, "Initial record review," and then you have a bunch of other entries for different work that you did that gets down to, you know, some amount.

Was the 4 hours "Initial record review," was that the total for the 14 or did you spend 4 hours per Plaintiff?

A. Four hours per Plaintiff and we did -- we had to do 28, do it 28 times.

Q. Okay.

A. Because --

Q. That's all I'm trying to figure out.

So, your testimony is that this entry means that you spent 4 hours reviewing each individual bellwether Plaintiff's records, right?

A. And it's heavily discounted because I thought the bill was too high.

Q. Okay. And the next item here is 1.5

hours, "Telemedicine conference with parents or guardians."

That means, correct me if I'm wrong, that you spent one and a half hours what you billed for approximately for each Plaintiff that you interviewed parents, right?

A. Yes.

Q. And then the next one is 1.5 hours, "Original research," et cetera, et cetera, on a bunch of things. That's 1.5 hours per Plaintiff, right?

A. Yes, sir.

Q. Thank you. Okay. And the next one, 2.5 hours, "Preparation of report including information from Dr. Hoffman." That's 2.5 hours per Plaintiff, right?

A. Yes, sir.

Q. And then 4 hours, "Additional record review concerning Dr. Krishnan's report," et cetera, et cetera. That's 4 hours per Plaintiff, right?

A. Yes.

Q. I got you. So, basically to do your records review and conduct the interviews and

everything and then getting through the report, you spent a total of 14-1/2 hours per Plaintiff, at least that's what you billed for?

A. Yes. And, as I say, I heavily discounted. I'd say it probably took me an additional 30 hours.

Q. So, when you did your preparation of your original report, including information from Dr. Hoffman, what was the information from Dr. Hoffman that you included?

MR. STERN: Objection; foundation. I'm not going to instruct him not to answer, but I think this is out of bounds.

BY THE WITNESS:

A. As I sit here, I don't know exactly what was in each of Dr. Hoffman's report. If it's -- if it's salient and relevant, I'm sure that Corey can provide it.

BY MR. ROGERS:

Q. Well, we'll see about that. I don't know.

A. I did review Dr. Hoffman's reports, and that's why I did all 14 cases once and then because Dr. Krishnan was hired, I had to do all 14 cases

once again. So, that's why the bill is so large. So, I did 28 times -- 28 cases, if you will, even though there were only 14 children.

Q. I got you. And goes your memory square with Mr. Stern's report earlier that you don't or do you remember whether or not the information that you received from Dr. Hoffman included neuropsychological testing?

MR. STERN: Same objection. Hoping to just have a standing objection about anything to do with Dr. Hoffman.

MR. ROGERS: Sure, yeah.

BY THE WITNESS:

A. Well, he is not a neuropsychologist, so the testing that he did was different, very different than what Dr. Krishnan did.

So, the reports had to be entirely redone based on Dr. Krishnan's report, which is largely based on neuropsychology as opposed to developmental and behavioral psychology, which is what Dr. Hoffman is.

So, everything -- all the analyses had to be redone because I was working with completely different data and completely different testing

based on neuropsychology as opposed to psychology.
BY MR. ROGERS:
Q. So, in this case you prepared an original report for all 14 bellwethers including these four with information provided by Dr. Hoffman about neurological and neurobehavioral evaluations that he did on the Plaintiffs, right?
MR. STERN: Objection; form. He never met with the Plaintiffs.
BY THE WITNESS:
A. Yes, I think so. I think I did 14 cases with Hoffman and then I was asked to redo everything.
BY MR. ROGERS:
Q. Let's go to the next invoice here, which is another one. It looks like it was issued on the same date, July 25.
Sorry. I get less adept at scrolling through records as the day goes on. Sorry for the little delay, but -- okay.
So, there seems to be -- tell me what this invoice is about because now it seems to be a bill for the four bellwether clients versus --
A. I think it's -- I think it's a breakdown

of what was done for the bellwether clients.

I know that -- I don't believe that I was paid any of this amount. I believe the whole bill was 161,000, which seemed like a lot. I think this was just --

Q. I see.

A. -- breaking it down for the four bellwethers although --

Q. I see.

A. Well, I think that's what I believe.

Q. Yeah. I see. So, you -- at some point in time were you asked to provide a separate invoice for, you know, an estimate of the amount of time you spent on the four as opposed to the 14, is that right, what this is?

A. That's my -- that's my understanding. It's been a few months.

Q. Okay. So, this one would have been generated at some point in time after the original one was generated because it relates to just the four, not the 14, right?

A. Well, I mean, it was relatively contemporaneous.

Q. Yeah. We went through a process whereby

we reduced the bellwether Plaintiffs down from 14 to four. So, okay. So, let me just take a little look.

A. For instance, the billing date is the date that I did the work, if you will, or when I submitted the larger bill. This is a subset of a larger bill for the four cases, not for the 14.

Q. But was this work, the 7 hours total here or 7.5, was this additional work?

A. I don't believe so.

Q. Additional time spent?

A. No. I think this is a subset of the other bill.

Q. Because the other ones you said that, just to go back to it, you said that, you know, you spent here a total of 14 hours per case and you said that was 14 hours per -- oh, I see. I think I know what you did.

What you did is you divided it in half because of the fact that you did reports twice, right?

A. Correct. That's why it says 7 hours or something for the four bellwether cases because I was asked to separate that out.

So, the invoice date is the 25th of July because that was when the larger invoice was submitted, but when I was asked to break it down to the four bellwether cases and the actual reports that you see in front of you.

Q. I gotcha. So, 14 -- yeah, 14 divided by -- 14.5 divided by 2 is 7.25. Okay. I got it.

All right. Let's go to the final invoice here. This is from August 23, 2017. This looks like another copy of the previous one.

Is that just a -- oh, I see. It actually describes the Plaintiffs here, client assessments.

Does this relate to the seven people -- no. This is an additional one.

Well, you tell me. I'm sorry. I am doing too much talking.

What is this?

A. I'm sorry to not be fast on the draw with these. It's been a long time. I'm having trouble -- I'm trying to scroll, but I realize it's on your computer.

Q. Right. You tell me what you want to do. I'm trying to show you as much as I can here.

So...

A. I'm not sure if it's the same. I forget how much the invoice was for the 2017 when we originally looked at it. It could well be the same.

Q. So, it reflects work that you did by actually going to Flint and conducting some examinations of these individuals that are listed at the top here, right?

A. Well, we did do that in 2017 as we discussed, yes.

Q. And none of them are any of the four bellwethers in this case or that we're down to now, right?

A. That is true. None of these cases had anything to do with the four bellwethers.

Q. Okay. So, I'm going back to the original one.

And this one actually relates to a different -- different work that you did because it relates to work that was done in July for seven clients, not six like the other ones. So that's different, right?

A. I believe so.

Q. So, what we haven't seen so far are the invoices for the work that you did that we talked about very, very early on in the deposition today when you visited Flint in 2015 and had the meeting at the school with a bunch of folks.

So, so far we don't have that invoice, right?

MR. ROGERS: I guess that's to you, Corey, really. Was that --

MR. STERN: It's a 2015 invoice and we're remote and it's not as accessible online. So my office has been trying to get it.

MR. ROGERS: Okay. So, we'll hope that that surfaces at some point between now and the next round here.

Okay. Let's see where we go next.

BY MR. ROGERS:

Q. I have a lot of questions, Doctor, about various things that are in your reports, and let's go through them in alphabetical order starting with EPPI SPPI . And this might get a little tedious at times, but it's just important to make sure that I understand what these reports mean or don't mean.

And, Doctor, I think, frankly, a lot of

these questions, since they are kind of the same for each Plaintiff, would be the same. So, I'm thinking of ways to shorten it up, but we'll just have to see how it goes.

Let's -- I'll open up the SPPI report so you see it on the screen as well as you having a copy in front of you in paper form. All right. So, this is Exhibit 5.

My first question is, with respect to your original entry here about the records that you've reviewed, you have a list of 1 through 8. I think you told me.

My question is whether you reviewed anything else, and I think you told me that you had reviewed the rough transcripts of the depositions of Dr. Krishnan and Dr. Specht; and you also told me about having reviewed the literature, scientific literature and list of references that you provided plus the three things or so that you talked about that you reviewed last night.

Other than those things, is there anything else that you've reviewed for EPPI SPPI case that just --

A. Just want to be sure the timeline. I

reviewed the depositions recently, not --

Q. Yeah.

A. -- in preparation for this case. I just want to be sure I understood. But there is nothing else that I can recall.

Q. At the time that you wrote the report, this list 1 through 8, is that a complete list of the materials that you had reviewed so as to write the report?

A. Well, I should have expanded Item 5 so that there would be nine items because bone scan is obviously different than blood level. So, that's an error on my part. It should be two separate items.

Q. Gotcha. So, bone lead scans and blood lead level. Well, actually --

A. Yeah.

Q. Well, actually you have "Blood lead level capillary," and then you have, "Bone scan." So, it looks like it's correct.

A. It's an error. It's an error. So, we should have gotten rid of blood lead level then on 5. I just see that it's repeated there.

Q. All right. Thanks.

On page 2 of the report you say here this section that I will just highlight for you quickly about EPPI SPPI

"Medically EPPI is a well child."

What basically did you mean that?

A. Well, it's a child who is growing and developing physically well, and that's a relatively standard definition of a well child. Even though he has bronchitis or conjunctivis or asthma, those are what I call the usual array of childhood illnesses, coughs and colds, otitis media.

Q. Yeah. You say here what I'll highlight in this next paragraph.

He "has no chronic medical illnesses except for skin rashes which seem to improve but recur despite the use of hydrating creams and ointments."

Does this mean that he's had rashes, skin rashes, both before and after April 2014?

A. I'm not sure what -- if it means that. We brought up -- in an hour-and-a-half discussion with mother we discussed his skin rashes. Months later, I don't remember exactly when each rash was.

Q. So, you say -- in this section here you

have a family history. Then I want to ask you about this one.

Oops. That's not right.

"Social history showed that EPPI [redacted] parents are both in their early 30s and healthy. Sees his father," et cetera. You describe what the father does. You describe what the mom does, et cetera.

Why is this important information to obtain for you about their social history and information about the parents' livelihood and education?

A. It's standard operating procedure for any physical exam or evaluation of any child.

For instance, if the -- but in this case, for instance, if the father had exposure to lead, if he worked in a factory where there was lead exposure, that kind of thing.

But it's routinely done for any and all children that a pediatrician would see. You want to know about how the child lives, what kind of environment he's embedded in, and if there are any problems in terms of his social environment.

Q. I'm going to show you the other reports

later, but I noted when I was looking at them carefully that you did not include in your reports any information of this type for the other bellwether Plaintiffs.

Is there any reason why?

A. Not offhand. I can't think of any reason why.

Q. Is the social history of the type that you're describing here, that is, the type of employment that the parents have, the level of education that the parents have, important in any way to determining the likely future potential of the children to engage in any type of employment or educational prospects?

A. Well, for instance, parents who have -- who have a lot of education usually are able to afford their children better access to education at better schools. They typically provide more stimulating environments. So, we do like to ask about that kind of thing.

Q. And at least part of what you were doing in some of your opinions and conclusions or analysis was to make comments about what the future holds for these kids, right?

A. I'm not sure. Can you show me where -- what you're referring to in the report?

Q. Yeah. In terms of you provide in your opinion sections comments about the potential for -- well, we'll get to it. Why don't we do that. Let's wait till we get there. So, we'll get there.

A. I know what you're referring to now.

Q. Okay. Well, then, what is your answer, then?

A. Well, I was looking at Dr. Krishnan's report describing the likelihood of the children requiring individualized educational plans and whether or not they'd graduate from high school and whether or not they'd be able to graduate from college or graduate school based on the developmental testing and the deficits that she describes therein.

Q. Did you make an independent assessment apart from Dr. Krishnan about their potential to graduate from high school or college and what employment they could achieve?

A. I'm going to say no.

Q. Is that true with respect to all of the

children, the four that we have here?

A. That's correct.

Q. There is an example of where I didn't say "Correct" but you said "That's correct" in the answer so we got it right that time I guess.

On page -- I think we covered a lot of these, but on page 3 -- I'm going to highlight it for you. It has to do with the issue of the service lines and replacement of service lines.

In 2016 she reported that a black truck pulled into the driveway, began digging in order to replace what the workmen said was a lead pipe. She didn't actually witness them replacing the pipe. Another company came and they dug up the water lines again replacing them for a second time, et cetera, et cetera and so on.

Did you receive any additional information besides what Mrs. Wheeler reported to you about whether or not in fact the service line that was dug up was comprised or made of lead?

A. I did not receive any other information about that particular service line.

Q. Next one is on page 4. I'll highlight it for you here.

It says -- I'll scroll up so you can see the whole paragraph, but you're talking about the Virginia Tech study from Dr. Edwards and so on and the different homes that were evaluated.

You say in the last couple of sentences, "Of interest and importance is the fact that each parent I spoke with reported that the water in their homes in 2014 and 2015 was malodorous and/or discolored. This suggests but does not prove that their water was lead tainted as well as placing these particular, quote, 'bellwether' case children potentially at even higher risk than other children in Flint."

So, my first question is: Why? That is, can you explain why the fact that the parents are reporting that the water was malodorous and discolored suggests that the water had lead in it?

A. Well, we were talking about chlorination, for instance, in a swimming pool or why we chlorinate our water to prevent bacterial infections, and that's why water treatment programs chlorinate the water.

We learned when the Flint water system stopped producing -- stopped adding

organophosphates that chlorine levels also dropped, and that could contribute to the malodorousness. And it indicated to me that, although it was not proof, that the water was affected by the lack of organophosphates coating the pipes.

Q. But whether or not the -- the fact that there -- lead in the water does not result -- does not result in the water being malodorous or discolored, right?

A. That's correct. I was referring to the fact that the chlorination could have -- lack of chlorination could have caused it.

Q. So, the lack of chlorination would cause the water to smell bad and be discolored, not the fact that there potentially was lead in it, right?

A. Well, it shows that the organophosphates weren't working and so that suggests that lead might -- would be leaching from the pipes where the organophosphates weren't working because they weren't present anymore, and that's why the chlorine levels fell and that's why the lead levels in the water went up.

Q. Okay. Bottom of page 4 here. I think I asked you about this before. Just to make sure we

cover it.

And I'm going to ask you the question for -- just to go back to this one, the smelly water and it being discolored.

The answer that you provided to me in explaining why that was significant to you and suggested that there was lead in the water, that applies to all four of the bellwether Plaintiffs, right?

A. I believe all of them reported malodorous, discolored water, but I'm not sure that all four of them did as we sit here. It would be in each of the reports, though.

Q. All right. And if it was in each of the reports, the importance or significance of it would be the same as you just described, right?

A. Yes.

Q. Okay. The next paragraph here is you're describing the FAST pipe replacement program, service lines, et cetera, et cetera. And we talked about this before.

The source of this information that you are reporting is this reference to the MLive news report that was cited here after that paragraph,

right?

A. Yes, that's the reference that I employed.

Q. So, just to close this out, then. I don't mean to repeat things, but just to make sure.

The -- you don't know what the -- if the -- strike that.

If the four bellwether homes, if the residences of the homes in which the bellwether Plaintiffs lived were inspected and excavated for purposes of determining what the composition of the service lines were during the FAST Start program, you don't know what the results of those inspections or examinations were with respect to the issue of the composition of the service lines, am I right?

MR. STERN: Stern. Object to the form.

BY THE WITNESS:

A. The whole system was tainted.

BY MR. ROGERS:

Q. I know -- no.

A. It wasn't just the service lines to their homes.

Q. No, no. I know -- please, Doctor, I

know. You've said that a few times, but I would ask that you just focus on my question. Okay?

A. Okay.

Q. Is it a correct statement that to the extent that as part of the FAST Start program the service lines that led to the -- any of the residences that the four bellwethers lived in, if the pipes were excavated, you don't know what that excavation revealed about the composition of those service lines, right?

A. Yes.

Q. Thank you.

Okay. Here's -- I think we covered this, but this is the description of the bone lead scans and the reference source that you described about another population. Just to confirm again.

The information that you had and relied upon for assessing what the bone lead measurement meant in terms of comparisons with other populations, this is the McNeill study that you referred me to earlier, right?

A. That's it, yes.

Q. And that's the sole source of that information that you have and relied upon, right?

A. That's the population-based study --

Q. Okay. You keep --

A. -- that we were assessing.

Q. Yeah, you say -- the fact that you said that leads me to want to make sure I ask the question. And, that is, are there other sources of information that you relied on besides population-based studies?

A. Well, all the information that I relied upon we've discussed as far as I know.

The population-based study in Toronto showed that the average child in Toronto had a lead level of 0.5 micrograms per gram of bone. We've been over that, but that's all I'm saying.

Q. Okay. I'll highlight this next paragraph to focus us on it, if I can.

"Levels of greater than 10 micrograms per gram of bone mineral indicate persistent ongoing exposure."

Where did you derive that language from?

A. Discussions and reading Dr. -- maybe not discussions. Reading Dr. Specht's report. Not discussions. Reports mention that.

Q. Right. And then "Bone lead levels

greater than 20 micrograms per gram of bone mineral indicate intense exposure."

Where did that come from, same source?

A. Yes, Dr. Specht's reports contain that verbiage.

Q. Did you note that when you read the rough draft of his deposition transcript that he withdrew those references and said that they were incorrectly included in his bone scan reports?

A. I saw that. I'm not an expert in his work. So, I believed his work when he sent me those reports and I used his reports, and I did see that he withdrew that when I read his -- when I read his deposition over the last couple of days. I don't know exactly when I read it.

Q. Right. So, you also withdraw these two statements, then, since it's based on what he said and not any independent evaluation of your own, right?

A. Yes. If Dr. Specht has withdrawn that, I withdraw it because I relied upon him.

Q. And you talk about "E[redacted] level of 6.72 micrograms per gram of bone mineral is consistent with a history of past chronic exposure to blood

lead in my opinion."

What is that based on? I think you've described it before, but just to be sure, tell me about that.

A. Well, I tried -- like to be telegraphic since we have described it before.

This is a lot of lead for a child to have in his bones. It indicates that there's clear exposure in the past given the timelines that we've discussed. And as we said before, I have no information as to other sources even though I attempted to find them.

Q. And then you go on to say, "The basis of this opinion is the fact that EPPI drank leaded water from the Flint River in 2014 and '15."

That's the only source of the lead that you believe resulted in him having that level of lead in his bones during the entire course of his life, is that right?

A. That's the only source I was able to identify.

You know, I've done a lot of evaluation of the epidemiology of lead in a family's home and so we typically ask about lead paint and soil and

all that, the age of housing. We did all that.

These reports could be, instead of 14 pages, they could be 50 pages if we got into all that.

But I assure you that we did look for other sources in the parental interview. Didn't find that. Didn't find anything in the depositions. Didn't find anything, any other source other than the lead in the water.

Q. Well, on that subject matter, if you have lead paint, you have -- in a home -- you have paint chips, you have lead in dust and you have lead in soil, isn't it possible that the lead can get into the kids' bodies without the parents having reported that they actually observed them eating dirt or eating dust or eating paint chips?

MR. STERN: Object to form and foundation.

BY THE WITNESS:

A. You're asking about a possibility, Attorney Rogers?

BY MR. ROGERS:

Q. Well, I'm asking you the question I asked you.

A. Well, you used the word "possible" and

the answer is yes, it's possible.

Q. Is it plausible?

MR. STERN: Object to form.

BY THE WITNESS:

A. It's plausible that if there is lead paint in an apartment and that's documented, that that would contribute to a child's lead poisoning.

BY MR. ROGERS:

Q. Same with dust?

A. If there's leaded dust in a child's apartment, that would contribute to lead poisoning.

Q. Same with lead in soil?

A. If a child is playing in soil that's determined to be leaded, that can result in elevated lead levels as well.

Q. What is the mechanism by which lead in the soil can get into the home and also cause exposure from it being brought into the home?

A. Well, there's a variability associated with wind currents, et cetera. For instance, so first floor houses -- sorry. If an apartment lives in -- a child -- I'm sorry. I'm getting a little fatigued. Please excuse me. My voice is failing me.

Q. Yeah, why don't we -- let's -- why don't you answer this question, and we can take a break and then we'll continue on to 5:00 if that's okay with you. I'm getting a little fatigued myself.

So, why don't you go ahead and answer that question, and we'll take a break.

A. Well, first floor apartments have more access to leaded soil, for instance, when the wind blows. So, that's one issue.

If children are playing in a yard that doesn't have grass, that results in exposure. Like if you have bare surfaces, that results in increased exposure.

Lack of parental cleanliness when the dust and -- dust and soil get into the house can be a problem. The way the parents clean the house, not using the appropriate detergents, et cetera.

But it's more just the ways you could imagine that dust would physically get into a home. It has a nasty way of getting in, as you well know.

MR. ROGERS: Okay. So, it's -- before we go off the record, it's 4:00. I wouldn't mind continuing and we'll go to 5:00. We are definitely not going to finish.

If your preference, Doctor, is to stop, I'm happy to do that. I do have a hard stop at 5:00. Whatever you'd like to do.

I can pretty much guarantee you that the next round, at least from my perspective, you know, I can finish way -- you know, definitely before lunchtime. But I leave it up to you since we have to do another day.

What's your preference? I don't care.

MR. STERN: Can I talk to Dr. Bithoney during the break and then let you know?

MR. ROGERS: Yeah, that's fine, sure. That's fine.

THE VIDEOGRAPHER: The time is 4:00 p.m., and we're off the record.

(WHEREUPON, discussion was had off the record and a recess was had from 4:00 to 4:05 p.m.)

(WHEREUPON, at 4:05 p.m. the videotaped remote deposition of WILLIAM G. BITHONEY, M.D. was adjourned, to be reconvened at 9:00 a.m., on November 17, 2020.)

I, CORINNE T. MARUT, C.S.R. No. 84-1968, Registered Professional Reporter and Certified Shorthand Reporter, do hereby certify:

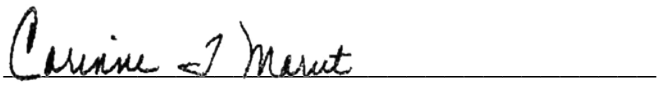
That previous to the commencement of the examination of the witness, the witness was duly sworn to testify the whole truth concerning the matters herein;

That the foregoing deposition transcript was reported stenographically by me, was thereafter reduced to typewriting under my personal direction and constitutes a true record of the testimony given and the proceedings had;

That the said deposition was taken before me at the time and place specified;

That the reading and signing by the witness of the deposition transcript was agreed upon as stated herein;

That I am not a relative or employee or attorney or counsel, nor a relative or employee of such attorney or counsel for any of the parties hereto, nor interested directly or indirectly in the outcome of this action.



CORINNE T. MARUT, Certified Reporter

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Please read your deposition over carefully and make any necessary corrections. You should state the reason in the appropriate space on the errata sheet for any corrections that are made.

After doing so, please sign the errata sheet and date it.

You are signing same subject to the changes you have noted on the errata sheet, which will be attached to your deposition.

It is imperative that you return the original errata sheet to the deposing attorney within thirty (30) days of receipt of the deposition transcript by you. If you fail to do so, the deposition transcript may be deemed to be accurate and may be used in court.

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E R R A T A

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UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

In re: Flint Water Cases	Civil Action No. 5:16-cv-10444-JEL-MKM (consolidated)
Elnora Carthan, et al. v. Governor Rick Snyder, et al.	Hon. Judith E. Levy Mag. Mona K. Majzoub Civil Action No. 5:16-cv-10444-JEL-MKM

AFFIDAVIT

I, WILLIAM BITHONEY, M.D., the undersigned affiant, being first duly sworn, on oath say that the testimony given at my deposition at the time and place aforesaid is the truth, the whole truth, and nothing but the truth, and that I have read the foregoing transcript consisting of Pages 1 to 286 inclusive, and do subscribe and make oath that the same is a true, correct, and complete transcript of my deposition so given as aforesaid, and includes changes, if any, so made by me.

FURTHER AFFIANT SAITH NAUGHT.

_____

AFFIANT, WILLIAM BITHONEY, M.D.

SUBSCRIBED AND SWORN TO before me
this day of , A.D. 20 .

_____

Notary Public

LAWYER'S NOTES

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